Vol. XIV. **FEB. 15, 1886.** **No. 4.**

TERMS: $1.00 PER ANNUM, IN ADVANCE; 2 Copies for $1.90; 3 for $2.75; 5 for $4.00, 10 or more, 75 cts. each. Single Number, 5 cts. Additions to clubs may be made at club rates. Above are all to be sent TO ONE POSTOFFICE.

Established in 1873.

PUBLISHED SEMI-MONTHLY BY

A. I. ROOT, MEDINA, OHIO.

Clubs to different postoffices, NOT LESS than 90 cts. each. Sent postpaid, in the U. S. and Canadas. To all other countries of the Universal Postal Union, 18c per year extra. To all countries NOT of the U. P. U., 42c per year extra.

THE NERVOUS SYSTEM OF THE BEE.

NERVES IN GENERAL, AND THEIR RELATION TO PAIN.

BEFORE entering upon the subject at the head of this article, let us briefly examine the nervous system of the human body, and discover, if possible, what is the function of the nerves; that is, what are painful and pleasant sensations—their origin and relation to motion. We can then better understand the nervous system of the bee.

Our bodies are provided with a great mass of nerves, of which the spinal cord, located in the backbone, and the brain, are the source from which these nerves branch out, and to which the nerves communicate all sensation. The whole structure is in form like a tree, the trunk of which is the spinal cord. From this are nerves, branching and rebranching throughout the whole body, until they become so small as to be microscopic in size, and so numerous that even the point of a pin, on coming in contact with the flesh, will communicate sensation to one or more of these nerves. As the nerves are more thickly crowded near the surface of the flesh, the surgical knife gives more pain while passing the skin than when it has penetrated further. Without these nerves we could feel no pain nor enjoy any pleasant sensation, as to see, feel, hear, or taste.

WHAT IS PAIN?

Pleasant sensation and pain are akin to each other, but different in degree. For instance, a warm fire is agreeable to cold hands; but if we should place those hands in the fire, we should undergo great agony. A certain amount of light is pleasant to the eyes; but direct sunlight gives pain. Now, the higher the intellect, and the higher the scale of creation in general, the more complicated the nerves, and, in consequence, the greater the power to enjoy pleasant sensation, and to experience pain. The lower the scale of development, and the simpler the structure, the converse is true. Hence man, of all creation, can experience the highest degree of pain or pleasure. On the contrary, the earthworm, when cut in two, by reason of its simpler structure feels comparatively little pain. True, it wriggles; but, so far as I know, the two parts perform the same function as before. You may cut a water-hydra (one of the simplest forms of animal life) into several pieces, and yet each will become as perfect as the parent. Then we infer that, accordingly, as the bee is simpler in general structure, and likewise in its nervous system inferior to that of man, so much less pain does it feel at the bungling hands of the apiarist. It certainly is a very wise provision of our Creator, in so constructing the lower forms of life that the latter, as a prey to the higher forms, may not undergo the agony that we would feel were we to be devoured by some terrible monster. The birds subsist upon insects and worms of all kinds, and God has so ordered it that these lower forms should not suffer, in proportion as we do. How do we know the lower forms of life feel less pain? Because microscopic examination shows their nervous system to be simpler as we proceed down the scale of animal life. The lowest class of animal life of which we have any knowledge, as the *Protozoa*, have no nervous system whatever, and are incapable of receiving any sensation, unless it be contact with other bodies. In fact, we find no nervous system until we come to the sub-kingdom of *Annuloida*.

Some one has said, that the bee is to the insect what the horse is to the animal. If we look at the cut opposite (after Cheshire), we shall see that the nervous system of the bee (represented by the white lines), though complete for the bee, is by no means as perfect as in that in the human body. As it would take a physician to point out the exact difference and marks of inferiority, I will not enter into full particulars here. The two medial and parallel lines traversing the whole length of the bee are what corresponds to the spinal column, though not the same in structure. Along its course, and intersecting at irregular intervals, are little disks with a white spot in the center of each. These are nerve centers, or, as they are termed, ganglia. From each of these ganglia, as you will notice, is a branch of nerves, some of which extend along the legs of the insect. As in the bee, we have something in our bodies corresponding to these nerve centers, or ganglia. They preside over the involuntary muscles, as respiration, digestion, pulsations of the heart, etc. It will be observed that they relieve the brain of a large amount of work. If the brain had to preside over the hidden machinery of our bodies, besides controlling our mind and actions with reference to the outside world, it would be like a man with too many irons in the fire. We should forget to breathe, or to make the heart beat, while performing some of the difficult problems of life.

Returning to the cut, if we touch the foot of a bee the sensation travels up the leg, as it were by electricity, until it reaches its ganglion. The impression, according to Cheshire, takes several courses, some communicating with the brain, and others transmitting the impulse to the other legs. The effect is almost instantaneous, and the legs (if the bee is held by the wings) will set up a vigorous kicking. To illustrate further the difference between the ganglia and the brain, as before stated, let us cut off the head of a bee, and note the effect. The brain, represented by the little lobes between the eyes in the cut, is now completely separated from the body of the bee, and yet the wriggling goes on as before, and will continue to do so for five or six hours or more. With the tweezers we grasp one of the legs. The other legs will come to the rescue, and struggle vigorously to push off the offending object. The sting, too, makes a desperate attempt to thrust out its fangs. In, fact, the headless victim seems to be so far in possession of his faculties as to be actually alive. A mud-turtle, as I have found by repeated experiment, will crawl about, a week or more after his head has been completely shot off. Do the bee and the mud-turtle live, and do they feel pain after decapitation? Facts seem to indicate that they do not, and that these singular movements are only manifestations of the nervous ganglia. In lower animals, these nervous centers seem to be possessed of more functions than those of our body. If a man is beheaded, all outward movements of the body are suspended almost immediately; but not so with the bee. In removing the head of a bee, the power of motion and the seat of consciousness are completely separated, and the line of communication between the nervous ganglia and the brain has been broken. How do we know that, therefore, a bee does not suffer pain? By analogy, and experiments upon the human family. Well-authenticated cases are related in medical works, of soldiers in battle being shot in the backbone, thereby completely severing the spinal column. Below the wound, paralyzation sets in throughout that part of the body. If the feet be now tickled or pinched, they will jerk back violently; but the wounded soldier has no knowledge of these movements, except as he sees with his own eyes what is transpiring. After the spinal cord is united, sensation returns to the affected parts. The spinal cord in the neck of a frog may be severed, and the phenomena will be almost identical with the case just mentioned. From these, you observe that direct communication must be established with the brain, in order that pain from bodily injury may be felt.

The physician gives cloroform and ether, either to paralyze the nerve centers, or to render the patient unconscious. In both cases he will feel no pain while the operation is going on. So with the bee. The seat of consciousness is removed, when the head is cut off. He may wriggle for hours, and yet feel no pain. Like the mud-turtle, when his head has been cut off, as the boy said, "He is dead and don't know it."

ERNEST R. ROOT.

BEE-TALK.

HOW WE DO OUR EXTRACTING.

WE usually keep from 50 to 60 colonies in an apiary, spring count, and we think that number about right. That gives us a fair day's work for our crew of boys, after going from four to nine miles with teams to get there, and gives us time to go home and pack our honey in barrels, and we think, to get the best returns in honey, that number is large enough. As we live in the borders of a town of 4000 inhabitants, there are plenty of boys whom we can hire, as many of them have nothing to do, and are glad to get a job. We hire them from 12 to 20 years old. Beginning with the 12-year-old boy, we pay him the first year $6.00 or $8.00 a month. That depends on what kind of a boy he is. We hire for the lowest figure, and give him more if he earns it. The next year, if the boy has been faithful, we hire him again, and give him about $2.00 more a month, and about one month in a year is as long as we have use for the most of the boys. As we have 11 acres of land to cultivate, some of it in small fruit, we hire one or two of our best boys in the spring, about April 1st, and keep them all the season. We commence to extract about the 15th to the 20th of June. Then we take in two more young boys; and when we have gone over all the bees once, we put on our whole force.

The last two years, including myself and my son, our force has been ten hands, besides one carpenter at work in the shop at home. I have no doubt but some of the bee-masters will laugh at the amount of help we employ to do our work. But, recollect we spend from 1½ to 3 hours on the road, going to our work every morning, and as much coming home again; go with two teams, one to carry the boys and the other to haul the honey and traps we have to take along, and we think we are working to the best advantage. Perhaps we are not.

We have our apiaries laid out in rows, so arranged that we have what we call Main Street running

through the center, about 20 feet wide, for a wagon-road. Just about the center of the yard, and by the side of Main Street, we locate our extracting-house, which is a temporary affair. We set 4 posts in the corners, just 10 feet apart outside measure, and 8 feet high above the ground. Around the bottom we nail boards 12 inches wide. Around the top we nail on another round of 12-inch boards, so now we have a 6-foot space with no siding on it. For siding we take two breadths of cheese-cloth, 40 feet long, and sew them together side by side, making a piece 6 feet wide and 40 feet long. This will just reach around our house. About one foot apart, all along the edge of this cloth, we sew on strips of leather, about one inch wide and 6 or 8 inches long (we cut them from old boot-legs), leaving the leather clear of the cloth about 2 inches. To put on the siding, we commence at one corner, nail through the leather strips to the corner post one end of the siding; now nail all along the top edge of the cloth through the leathers, to the bottom of the top round of boards; go clear around the house, except the last 3 feet; there we have a wire-screen door, with spring to shut it; or, in the absence of the wire screen to cover the door, we nail our siding to the top of the door. As it is 40 feet long, and the house 10 feet square, it will just reach. Now fasten the bottom edge to the bottom board the same way, and we have a siding bee-tight, if we keep the door shut.

For the roof we have a cloth cover 10 feet square, with leathers sewed on the edges the same as the siding, which is nailed to the top round of boards, and held up in the middle by two pieces of 2×4 scantling, just long enough to reach across the top from one board to the other. The framework of the house is made just alike in each yard, and, of course, stays there; but the siding and top cover we take with us and put it up every day. We can put on the top and siding in five minutes, and take it off quicker. We are going to improve the roofing of our extracting-house. Sometimes a shower will come up suddenly, when we are at work, and our thin cloth roof, put on flat, doesn't shed water. We are going to make a top cover of duck, and put it over a ridge-pole, elevate the ridge two feet above the eaves, draw the cloth tight, and, as there will be no bearings from the ridge to the eaves, it will shed water. Now we have our house, and are ready for work.

We have an extractor for each of our apiaries, and keep them there during the honey season. We have kegs that hold 160 lbs. of honey each. We take as many of them with us as we expect to fill. Be sure to take enough, as it is easier to take back an empty keg than it is to bother with an overplus of honey. We use one keg for a strainer-keg, having a good-sized faucet near the bottom, to draw out the honey. We tie a square yard of cheese-cloth over the open end of the keg, and let it sag into the keg enough to hold a large pail of honey. In the corner of the house, handy to the extractor, we dig a round hole, one foot deep, large enough to set in one of our honey-kegs to be filled; close by the side of the hole we set another honey-keg; on that we set our strainer-keg, with faucet over the keg, in the hole, which has a tunnel in it, and in the tunnel a wire-screen strainer to catch any stray bees that may be liable to get into the honey in passing from the strainer keg to the store keg below. When one keg is filled we roll it out and put under another. We set our extractor about the middle of the house, fronting the door. As the combs come in from the field or hives, they are placed just by the right-hand side of the door. Now, half way from the door to the extractor we place a honey-keg on end, and on that we place our cap-catcher. We use a wooden keeler, holding about a large pailful. Two hands work in the house—one experienced hand, and a boy. The boy stands by the uncapping-stand, takes up a comb from where they are set when they come in from the hives, uncaps it, and sets it down, leaning it against his stand, on the left side, between him and the extractor. That is his work—uncapping combs, and he doesn't have any time for fooling. The man at the extractor picks up the combs at his right hand, extracts them, and sets them down by the left side of the door, empty, ready to go back to the hives. The combs have made just a half-circle since they came into the house, and are now just by the side of the door, where the outside boys can reach in and get them, without going in and getting in the way. We have a large tin pail made for the purpose, that sits under the extractor, in which to draw the honey and pour into the strainer-keg, which stands in the corner, at the left of the man who runs the extractor; and it is his part to extract and fill the kegs, and look after his boy and keep things in order in the house.

Now, as we worked ten hands last year and the year before, there are eight at work among the bees. Take one of the most experienced hands, and give him two boys to help him; then make up another trio of boys the same way. Three hands make a good set to work together. After making up the two sets there are two hands left, and that is usually myself and the greenest boy in the lot. Now, one set of hands takes with them a smoker, and each a brush to sweep bees from the combs, and what we call a swarming-box. It has a bottom and three sides, leaving one side open. Set that down by the side of the hive to be worked; give the bees a little smoke; turn back the cover and pry up the honey-board, take out the movable front and front cushion. Now our frames are standing on the bottom, flatwise to us. Just take a glance to see if the queen is in sight; if not, take out the first frame, and set it into the swarming-box, with the back side of the comb toward the open side of the box. We want to find the queen, and we have parted two combs, so there are two places to look. Let the foreman who takes out the combs look in the hive, and his assistant look in the swarming-box. If she is not seen, then take out another comb, and look until all are out; and then if the queen has not been seen, look over the few bees that remain in the hive. Sometimes she will be found there. If she is found we put her in a cage until we are done with the hive, and then let her out into her own hive. It is very seldom that we miss finding the queen when we are taking the combs out of the hive. If we should fail to find her we look carefully when we sweep the combs, when she will usually be found. If we fail to find her at all, we don't take any of the bees to make up new colonies.

Well, when we have the combs out of the hive we sweep the bees all off, into the hive, and send the combs to the extracting-house by the small boy. The first hive we open we leave without combs until we get through, and then fill it up with the

combs of the last hive opened, so that no colony gets its own combs back again. Now, after each set of hands has a hive shut up without combs, and the combs are all in the house together, then each set opens another hive, finds the queen, cages her, and then the foreman and one of his assistants take a comb by the corners and sweep each one side of the comb—brushing the bees either into the hive or swarming-box. When they have four or five combs clear of bees, the other boy takes them, two or three in each hand, and carries them to the house, and brings back as many empty combs and sets them into the hive. By that time the rest of the combs are ready to go to the house. When the boy takes them and brings back enough to fill out his hive, he fills up the hive and liberates the queen, and then shuts up the hive. By the time he gets his hive done, the other two boys have some combs from another hive, ready to go to the house, and so we go, some taking out combs and sweeping off bees, others going and coming with combs, and shutting up, others extracting and putting up honey, all as busy as bees, while the boss does what he can and oversees the whole yard. We take our dinner and supper with us, and have a picnic every day. When we get done we down with our tent, load up, and then hitch up and drive home, and then draw our honey out of the kegs into barrels in the honey-house, and mark the date of the year and day of the month on each barrel; also mark × for the first extracting, ×× for the second, and ××× for the third, etc.

During the extracting season we have very busy times. If we lose a day, from any cause, it just means a loss of 1000 to 1500 lbs. of honey. The most we ever took out in one day was the 20th of July, 1885, when seven of the boys, including my son, went four miles and took 2075 lbs., and I had two boys to help me in the home yard, and we took 880 lbs. the same day, making 2956 lbs. of basswood honey. There were 15 days that we took 1000 lbs. and over each day, in the season of 1885.

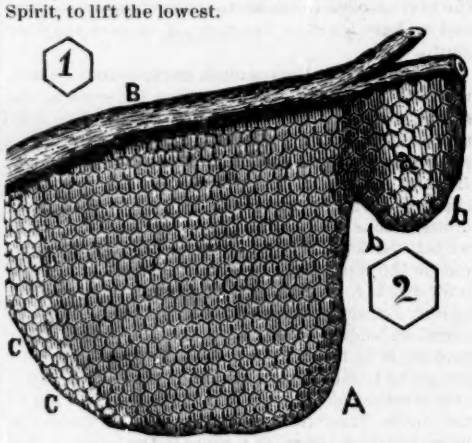
Platteville, Wis. E. FRANCE.

Why, friend France, you almost take away one's breath. I do not know that we have before had an account of where extracting is done with such system as you manage it; and, best of all, instead of advertising for experienced help, you take boys right around your own home—common, every-day boys, such as all of us find everywhere. These boys enjoy the work, of course they do. It is a "picnic" to them, as you say, and yet they earn money, and learn industry and thrift. The education you give them is, without doubt, worth more than the money they receive, and you are helping to solve this vast problem of finding something to do for a world full of uneasy and discontented people. I can easily understand how every thing goes along like clockwork, when the bees are not disposed to rob; but let a dearth of honey come, when the hives are full, and, oh my! what a time! But very likely you keep so well up with your work, that, when the dearth comes, you are ready to stop. I know you have had some experience with robbers, from the precautions you take; and if such precautions are not taken, the bees often get to robbing when there is *not* a dearth. Now, friend F., you have given us a glimpse of your busy home, and we want to know more. How do you sell all this honey? What do you do when swarming time comes? How much increase do you make? Tell us more about it. With ten men and boys to look after, I can readily imagine you have all you want to do, without working very much yourself, and I shouldn't wonder if you would have abundant need of that "greenest boy" to run errands for you. It reminds me a good deal of the way we often manage here on our own grounds.

SOMETHING MORE ABOUT THE APIS DORSATA.

HOW THE COMB IS BUILT; SIZE AND DEPTH OF CELLS, ETC.

FRIEND ROOT:—Herewith I send a drawing of *Apis dorsata* comb. I hope it will make my description clear. I shall try again this year, if I can get time, to investigate this bee. I wish you could be with me here a month or so this cold season. I would show you all the bees of the country, and, best of all, I would show you 81 churches, nearly 2500 baptized adult members, with schools, etc., that you might rejoice with me in the ability of God's word, in the hands of the Holy Spirit, to lift the lowest.



APIS-DORSATA COMB.

A is the brood comb, which is of a pale amber color. Cells here are beautifully regular, and comb perfectly straight. See measurements formerly given. B, is a limb of a tree. C, new brood-comb, and enlarged in direction of C C; *a*, honey-chattie, spherical in shape. Deepest honey-cells are at *a*, and three to the inch; *b*, shallowest honey-cells. Honey-cells are so arranged in honey-chattie, as regards length, as to form a cylindrical shape on the limb. No brood is ever placed in "honey-chattie." It contains pure white, or pale amber honey, and the comb for honey is beautifully white.

Toungoo, British Burmah. A. BUNKER.

For an explanation to the above cut, our friends are referred to page 342 of our issue for May 15, 1885. You will find there that I could not quite understand friend Bunker's description of the peculiar comb which the bees build, expressly to store honey in. This comb is named, as you will notice above, "honey-chattie." The large comb occupying the central part of the engraving

is the single brood-comb attached to the limb. By referring to the former article mentioned above, we find that this honey-chattie is sometimes as much as six inches in thickness, making the cells on each side three inches in depth, properly sloped to prevent the honey from running out. Fig. 1 gives the size of the cells for the brood-comb, being about like our drone-comb. Fig. 2 shows the size of cells of this strange honey-chattie. By the way, friends, wouldn't it be a curiosity indeed, if it were possible to get one of these great chunks of honey across the ocean, to be shown at some of our national conventions? What a crowd it would bring! Friend B., don't you think it possible? We are anxiously awaiting the result of your experiments in trying to domesticate *Apis dorsata*.

THE TEMPERATURE OF THE EARTH.

SOME VALUABLE FACTS, FURNISHED BY FRIEND S. CORNEIL.

IN view of recent references to the temperature of the earth, the following facts may be of interest to the readers of GLEANINGS. As regards temperature, the crust of the earth, down to the point where the internal heat is met with, may be divided into three strata. In temperate climates, the limit of the first stratum is reached when the thermometer ceases to indicate the diurnal changes of temperature at the surface. This is at a depth of three to five feet, depending to some extent upon the nature of the soil. From this point down to 40 ft., and in some cases to 100 or 120 ft., according as the material passed through is solid rock, clay, sand, or water, there is a stratum, the temperature of which is affected by the changes in temperature of the seasons only. Below this there is a stratum having a constant temperature, but whose degree of heat depends upon the mean annual temperature of the locality. After this stratum, having an "invariable temperature," is passed, the temperature of the earth increases 1° for every 50 to 75 ft. in depth. The following quotations from authorities on the subject will perhaps be appreciated by the reader:

In temperate climates the temperature remains unchanged at a depth of 3 ft. from the surface, from day to night. At 20 ft. the annual temperature varies but a degree or two. At 75 ft. below the surface the thermometer is perfectly stationary. In the vaults of Paris observatory, 80 ft. deep, the temperature is 55°. In tropical regions the point of unvarying temperature is reached at a depth of one foot.—JOHNSTON'S "*How Crops Feed.*"

It is well known, that there is a limit of depth within which the variations in the temperature of the air make themselves felt. In temperate climates this is from 80 to 120 ft. Springs which rise at a lesser depth than 100 ft. have a temperature which varies with the seasons, whilst waters rising from a greater depth have a constant temperature, depending only on the heat existing at their source. Springs whose temperature is above the mean annual temperature of the locality, are called hot springs.—*From the German of* FRANZ SCHNACKHOFER, *Professor at Imperial and Royal School of Agriculture, Vienna, quoted in "Fuel and Water."*

When the bed which forms the reservoir for springs is at such a distance from the surface as to be beyond the zone of season changes, and yet within that which is influenced by the climate, the water has a temperature equal to the mean annual temperature of the locality where it rises. In Britain this zone of constant heat is from 200 to 300 ft. deep. After this is passed, the temperature increases 1° for every 50 or 60 ft.—*Chamber's Encyclopædia.*

If the thermometer be placed in a deep cavern, the variations disappear, and one uniform temperature is registered under all circumstances. What that temperature is, will depend principally on the climate of the locality, the constant temperature being nearly the mean annual temperature of the surface.—HUXLEY, *in "Physiography."*

It has been stated, that the temperature of the peculiar caves beneath the city of Paris, in one of which the great clock of the observatory is kept, some 80 or 90 ft. below the surface, is 50°. The mean annual temperature of the city is 57°. As we ascend mountains, the temperature decreases 1° for every 334 ft. The King's Chamber, in the Great Pyramid in Egypt, is about 300 ft. above the level of the adjacent plains, and is protected on all sides by 180 ft. of solid masonry. Its temperature is 68°. The mean annual temperature of Cairo is a little below 70°. Since the degree of heat in the stratum of "invariable temperature" so nearly agrees with the mean annual temperature of the locality, the following list may be interesting. The figures indicate the mean annual temperature in degrees Fahrenheit:

Toronto, Ont., Canada	44	Boston, Mass	48
Quebec, Quebec	41	Cleveland, O	49
Eastport, Me	41	Columbus, O	53
Pembina, Dak	35	Cincinnati, O	56
Port Huron, Mich	45	Detroit, Mich	48
Grand Haven, Mich	47	Erie, Pa	50
Burlington, Vt	46	Philadelphia, Pa	53
Milwaukee, Wis	45	Chicago, Ill	49
Buffalo, N. Y.	47	Des Moines, Ia	50
Portland, Me	47	Leavenworth, Kan	53
Newport, R. I.	50	Cairo, Ill	58
Oswego, N. Y.	48	New Orleans, La	69
Albany, "	48	St. Paul, Minn	44
Duluth, Minn	40		

Of course, within a few feet of the surface the temperature will be higher than the above figures in summer, and lower in winter. On one occasion, when the outside temperature was 41° below zero, the air came in through my sub-earth pipe at 38° above; that is, in passing through 170 ft. of 9 inch sewer-pipe, laid about 5 ft. below the surface, the air acquired 79° of heat. I have observed that the air is not warmed quite so much toward the close of a cold winter, owing, I suppose, to the gradual cooling of the earth around the pipe.

There is an atmosphere circulating below the surface of the earth, as well as above it. This "ground air" extends down to the "ground water," the level of which is indicated by the level of the water in wells. The nature of "ground air" has been examined by Prof. Nicholls (see Sixth Report of Board of Health, for Massachusetts, for 1875) and others, and it is found to be so very rich in carbonic acid that, at a depth of 13 ft., it is sometimes irrespirable, and will extinguish a light. The amount of oxygen is found to be in a measure inversely as that of the carbonic acid. It is this soil air which sometimes proves fatal in deep wells, and not carbonic acid separated from the air above, and sinking into the well by its superior weight, as is often supposed. Intelligent bee-keepers will at once see that, in order to bring pure air into the cellars, it will not do to use drain-tile for sub-earth pipes. Cast-iron water-pipes, or sewer-pipes cemented at the joints, should be used. A nine-inch pipe of the latter, 170 feet long, cost me about $110 when finished.

Ernest's experiments are watched with interest; but if he will look up Joule's experiments in determining the mechanical equivalent of heat, he will see that the temperature of the water in the pail, after being pumped up, was not exactly the temperature at the bottom of the well, 97. ft deep.

Lindsay, Ont., Canada, Feb. 1, '86. S. CORNEIL.

I am sure, friend C., that we are very much obliged indeed for the very full and complete manner in which you have discussed this matter of the temperature of the earth. In regard to your caution, however, at the close of your article, it seems to me that carbonic acid is not common enough at a depth of from three to five feet to make it necessary for us to go to the very great expense of either iron pipes or burnt sewer-pipes with cement joints. I confess that I have never before understood how it was, that carbonic acid came to be present in wells and mines.—There is one point, and the one that concerns us most, in regard to this matter of the temperature of our earth, and I think it has hardly been touched upon. It is this; for protecting bees or other domestic animals, it is not necessary for us to go into the ground so far that we have an absolutely unvarying temperature. A very little banking of earth makes quite a difference, I have discovered, and all we need to do is to make our cellars or outdoor caves with their sub-earth ventilating-tubes deep enough to get pretty nearly the temperature we desire. If I understand you correctly, the temperature I gave of Mammoth Cave was not to be taken as a guide to the mean temperature of old Mother Earth in all localities, but simply the mean temperature of that part of Kentucky.

A HONEY-KNIFE FOR ONLY A DIME.

SOMETHING FOR BEE-KEEPERS WHO HAVEN'T MUCH MONEY.

HOW often do we find a tool, worth only a few cents, that will do the work of one that has cost a dollar or more! I have sometimes had such an experience, and felt out of patience with myself to think it never occurred to me that a cheaper form would answer every purpose. Below is a picture of a honey-knife that illustrates the point.

OUR TEN-CENT HONEY-KNIFE.

The blade is made of a thin slip of steel, in the form shown above, 2x4½ inches. The handle is made of malleable iron, securely riveted to the blade. The blade is so thin that but a very few strokes of a whetstone, oilstone, or even a scythestone, will give it a keen edge, for there is so little steel to grind away that the sharpening can never be a laborious process, and yet the quality of the steel is so perfect that it seems almost impossible to bend or injure it. You can sharpen it on one side or both sides, as you choose. You can use it for uncapping, or for cutting up combs in transferring; and for the latter it is, in my opinion, superior to any other knife made, at any price. For scraping off wax from honey-boards, tops of frames, shipping-crates, or even wide frames and sections, no other tool has been brought out any thing like it. The wide-pointed putty-knives we have sold so extensively for the purpose come pretty near it. But this answers every purpose of the putty-knife, besides being a honey-knife that may be equal to any. The sharp point will be found to be very convenient for a great variety of purposes; and after all, if you leave it out in the rain, or forget it, you are only ten cents out. A good many times I would give ten cents for a new one, rather than go after the old one, when it happens to be some little distance away. It seems to me it would pay almost every bee-keeper to have three or four of these handy little implements; that is, if he has a good many hives. We notice the cut is marked "patented." This was done by the inventor, who intended it for a knife to use in the kitchen. But if you pay the ten cents, you can use it in the kitchen, or out among the bee-hives, just as you choose. I shouldn't wonder if it would pay you to get one for your wife also. Price 10 cts.; 5 for 45 cts.; 10 for 80 cts.; or 100 for $7.50. If wanted by mail, add 5 cts. each extra for postage.

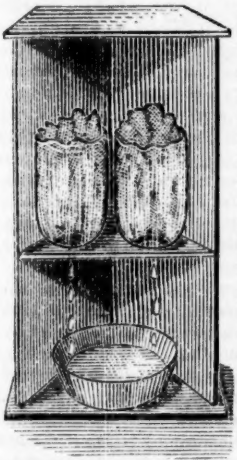
REVERSIBLE BEE-HIVES AND REVERSIBLE FRAMES.

SINCE the description of Heddon's hive and arrangement, so many letters have come in, describing hives and various arrangements for reversing hives as well as frames, it begins to be almost beyond my strength to go through the descriptions and give an opinion of them. The greater part of them are nothing particularly new. Years ago, Dr. Conklin, of Delaware, Ohio, sent me a hive to try, which had frames perfectly square, and set in the hive so one corner of the frame was down. These frames could be used with any one of the four corners down; but all the time I used it, it never occurred to me to take advantage of the ease with which these frames could be reversed. At the Ohio State Fair last fall, Mr. A. C. Benedict, of Bennington, O., had the hives on exhibition, with such frames. He has used these frames, I believe, for twenty or thirty years; and although they can be placed one side up just as well as another, he has never practiced reversing them. He says he does not want them reversed. Is it not a little singular, how progress and improvement and fashions revolve around, and once in about so long a time they come back to about the same old thing again? Even shallow sections, and hives used one above the other, have been in use for years, and have been repeatedly patented. Our old English works give pictures of them now; and before the advent of movable frames it was customary to have shallow hives with just the same depth of comb that Heddon uses, and these were worked two tiers, three tiers, and even four tiers high. Some of them used slats to induce the bees to build their combs regular, so that the owner might hold these shallow sections up to the light and look through them. A good many are working at a plan for movable frames that may be lifted out, no matter which side up the hive happens to be. I don't believe, friends, I would waste very much time or money on this matter just yet.

A NOVEL WAX-EXTRACTOR.

AN INVERTED FRUIT-JAR WITHOUT BOTTOM BEING USED FOR THE PURPOSE.

READING the article on p. 855, on the above subject, caused me to smile over an experience of several years ago. I wanted something to put bits of comb in, and scrapings, to save them (I was not home), so I asked for a pan, but soon found out "any thing was good enough;" and, chancing to see an old two-quart fruit-jar without bottom, and with the top on, I took that and set it bottom up. It being a warm sunshiny location, the more I put in the jar the more it settled, and soon began to melt; and in three or four hours there was perhaps a pint of as nice melted wax as ever ran out of comb. The jar-top being metal, a steel point soon made several holes in it. This I placed over a pan on a board with a hole in, and it soon gave a cake of wax. The fruit-jar extractor made quite a laugh on me, and stopped the women-folks from sputtering about the "nasty muss of wax-making." There have been more than 20 of those little wax-extractors made in the last seven or eight years. The first one gave birth to more improvements, so that now some are being used thus: Take a piece of coarse wire cloth, crowd it down the can; on top of that some fine wire cloth like queen-cage cloth, then another piece cut a little large and put in so as to bulge upward, and your jar is ready. For the stand, cut two boards 14 in. wide and 24 inches long; two boards, 14 in. square, and a triangular piece 12 in. on two sides. These sides meet and form a right angle. Bore a hole in the center of the triangular piece, large enough to let the top of your fruit-jar in, or two holes for two jars. Nail the two long pieces together, and to the ends nail the two pieces 14 in. square, as shown in the cut. Now, 10 in. from the bottom, nail the triangular piece. The adjoining cut will make the matter all plain. Into these jars I have put bits of comb honey, and even old brood comb will clean up in tiptop shape. As old bottomless fruit-jars are generally handy, or even large glass bottles or demijohns, the time, making, and expense of the woodwork is small. As a preventive of worms infesting the wax, it is a saving over keeping the bits till enough to pay for melting, and I think more wax is actually obtained. The amount of honey run through is not going to make robbing, because it is always in that place, and the bees will look for some every time work is being done. The bees are always peaceable about it.



THE FRUIT-CAN WAX-EXTRACTOR.

The extracting is not all it is good for. A few bits of smoker wood can be kept dry in the back corner under the three-cornered piece. It is a stand upon which to put queen-cages, a smoker, or dozens of other things. Two fruit-jars, mounted as I have described, will keep every thing in the shape of comb and broken honey all melted up, from an apiary of 20 to 50 colonies. One of the extractors will run off from 5 lbs. to 25 lbs. per day. I have seen 4 lbs. run through two of the 2-qt. cans in one hour, all from the bits of new comb, drone brood, scrapings of boxes, etc. So you see they are not so slow after all.

DISTURBING BEES IN WINTER, NOT ADVISABLE FOR THE NOVICE.

In your foot-note to G. M. Doolittle's article, p. 856, you say, "Bees can, perhaps, be handled successfully;" in other words, examinations can be made during winter upon the bees for scientific purposes. Well, I can tell you, beyond doubt, that it has been done without any apparent harm, and, like Mr. D.'s case, seemed beneficial in result. In the winter of 1883 one hive was examined almost daily, regardless of the weather; and from 1874 to 1880 there were perhaps a dozen hives experimented with without loss, to ascertain the heat of the bees during various changes, and how far the hoar frost would reach between the ends of the combs; the comparison of differently constructed hives, thick and thin lumber, and in various exposures, and how much more honey a swarm being often disturbed would consume than one let entirely and severely alone. Successfully examining hives for various purposes, forces myself and others to say to all but the expert, "Let them alone from the time of packing till the cleaning-out in the spring, during good flying weather, because, so far as I can learn, there are more queens spoiled, and more stocks made queenless, by the improper handling of the bees in the spring, than from any other cause, and yet every man knows what he is doing, in his own mind (I find many such among novices), because Yankee ingenuity is, in very many cases, conceit."

ABSORBENTS IN WINTER.

Mr. Heddon, on page 854, referring to moisture, reminds me of experiments relative to the use of wet cloths, and that the amount of seemingly air-tight sealing can be successful, and under what conditions. In 1878 I repeatedly took out and exchanged many of my top cushions, to dry them, and I always found them wet on the upper side. This induced the experiment of melting sugar into a solid block, made by pouring the liquid into a frame, and placing over the cluster; give no other food, and contract the space of the bees to the lowest point. Then envelope the whole in a non-porous material, to prevent the escape of any moisture. The hive is in this manner thoroughly packed and protected every way, and gives only a small entrance, thus causing a condensing of moisture on the slab of sugar. This furnished abundant liquidation for the winter supply, without an apparent cause of the bees going for water; but for this purpose, hermetical sealing of the division-board spaces is necessary as all others, or the side packing will take up what would pass out at the crack at the ends of them. This proves that, without close attention to minute details, success turns into failure.

H. L. JEFFREY.

New Milford, Conn., Dec. 23, 1885.

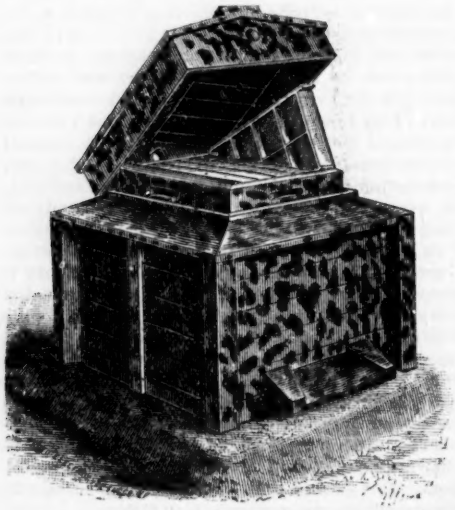
I would suggest, as an improvement to your trough, that the inside be lined with tin. This doubtless would add very materially to its working power. It is not all of us who have jars lying around and broken off

just at the right place for the above purpose. Having had some experience in working glass for chemical purposes, I will explain, for the benefit of those who may not know, how the bottom of jars can be removed. Around the jar where you wish to sever the bottom, draw the point of a red-hot poker. As the latter passes around, the glass will crack. In place of the 2-qt. jars mentioned above, you can purchase very cheaply at the drug-stores a gallon bottle. While this would add but little to the expense it would be much more convenient for taking large pieces of old comb. ERNEST.

A MOVABLE BOX IN UPPER STORY OF CHAFF HIVE.

FRIEND BISH GIVES US HIS EXPERIENCE IN THE MATTER.—SEE GLEANINGS, P. 12, 1886.

MY experience of three years with movable upper stories tells me that a box can not be tolerated. First, its thick lower edge kills too many bees in putting on. It is a box you can not use for any other purpose. But the Simplicity body does away with both objections. Friend Cross, on page 12, 1886, proposes to make a chaff hive longer, and to utilize vacant space at sides, with brood-frames. I find an objection there. It leaves a loafing-space for the bees between the wall and box, and they are sure to get in the way every time the cover is removed, taking time to replace it. I find the best remedy is (where new hives are being made) to change the dimensions of the chaff hive so a Simplicity body just goes inside of upper story, leaving ¼ or ⅜ inch space all round, and the lower story of proper breadth to hinder the bees getting up. Below is a cut of a hive I am making, especially arranged to take a Simplicity hive in the upper story.



THE C. P. BISH CHAFF HIVE, SHOWING THE SIMPLICITY BODY, FILLED WITH SECTIONS.

The hive as now made is 3 inches narrower than the one the above cut was taken from.

The outside of Simplicity body, 15⅝ inches, is just right for lower story; the double wall of upper story of chaff hive is only six inches high, instead of ten. Six inches is sufficient room for a cushion in winter, and makes it handy to catch the hand-holes of Simplicity body, and not so high to work over. The cover will have to be deeper, to make the difference. I find some colonies of bees build some comb between top-bars and bottom-bars of frames, and some do not. The space is Simplicity space, of course. C. P. BISH.

Petrolia, Pa.

Friend Bish, your idea of making the chaff hive lower, and making the cover a little higher, so it is, in fact, virtually the same thing as a cover for a 1½-story hive, is quite an idea, and no doubt it will answer just about as well for wintering as the full depth of the hive. The only objection that I know of is, that you do not get as many sections as where the wide frames are hung directly in the upper story, as we have them; and for extracting you would not get as many combs in the upper story for surplus. As it makes a little more machinery, I think I should prefer our style. Your mottled hive looks very pretty, and that a good substantial alighting-board is also a nice thing to have, as we know by experience.

MOVING BEES IN COLD WEATHER.

HOW TO CORRECT FALSE STATEMENTS.

I MOVED seven colonies of bees twelve miles on the 13th of Jan., when the temperature was 10° above zero. This was a day or two after the noted four days' blizzard. I used a sled, as the sleighing was excellent; no mishap of any kind, and the bees are to-day in the very best of condition (in cellar). I shall now have an opportunity of testing the amount of injury, if any, in moving bees in mid-winter. Of the 61 colonies I have in cellar there has as yet been no water dripping from the entrances, as is sometimes the case. I attribute this to the fact of maintaining a higher temperature in the cellar. With the exception of a few days, I have kept the temperature at 46 to 50°.

The false and sensational statements going the rounds of the papers, regarding comb honey being manufactured, and put on to the market, are having their effect, and no mistake. I was somewhat annoyed, some time ago, by hearing a very prominent merchant explaining to some very interested listeners, how, that "nowadays they manufacture the very nicest kind of comb honey without the aid of bees, etc." Of course, I "took the floor" when he got through, and in less time than I can write it I corrected him, and he confessed that he did not *know* that it was so, but that he had read statements to that effect in the papers. I took the opportunity to explain that the manufacture, by artificial means, of comb honey, was entirely beyond the possibility of the most advanced art; and I also referred him to your $1000 challenge for positive evidence of such manufacture. Now, when we come to reflect a moment over the wonderful achievements in the arts and sciences of this progressive age, we need not be at all surprised that the reading public, who have no practical knowledge of apiculture, will readily believe that the successful imitation of the nicest comb honey is entirely within the possibilities of modern science. One of the successful ways to correct this damaging misapprehention is for bee-men everywhere

(who can rightly handle the subject) to furnish articles to their county and local papers, which will readily be admitted, and in strong, clear terms, meet this popular error. There is no use to meet it in an abusive manner, but, rather, in that kind and candid manner that invariably carries conviction.

Another way to meet the matter is for honey-producers to guarantee every pound they sell to be absolutely pure. I have no fears as far as one's local custom is concerned; but when one has "a bit" more than he can dispose of at home, is where trouble seems to be ahead.

8—D. E. BRUBAKER, 31—61.

Maxwell, Iowa, Jan. 28, 1886.

Friend B., your suggestion is wise and sound. The celebrated Mr. Edward Murphy is now holding a series of meetings in Medina; and his great stronghold—in fact, the one great thing that gives him such wonderful power in banishing intemperance from our land is, that he deals directly with the *people* instead of laws and legislation. If he can get every man, woman, and child, in a town to wearing the blue ribbon, indicating they have signed the pledge, saloon-keepers would have so little custom that they would pull up stakes and move, or quit the business. The number who would violate a pledge, with their own signature at the bottom of it, would be too small in almost any community to support saloons. Well, now, if we can get the truth of this matter before the people, in regard to artificial comb honey, by inducing local papers to correct the statements, the whole thing will die a natural death, and it seems to me this is the way to do in dealing with any kind of sin—strike it where it starts, right in our homes, and in our family papers.

DO IMPORTED QUEENS PAY?

FRIEND DOOLITTLE'S EXPERIENCE IN THE MATTER.

TO the question in editorial (page 75, GLEANINGS for Jan. 15), "Do you get more honey from Italian bees, say one or two generations from Italy, than from stock bred four or five years in our own country?" I answer, no; and, as a rule, not as much. From the experience I have had with the imported stock as above (having had only one imported queen, but many from different breeders that were reared from an imported mother, besides those reared from the one I had) I much prefer queens reared from their best strains of home-bred stock by N. N. Betsinger, Dr. G. L. Tinker, Aaron Benedict, Dr. J. P. Wilson, J. M. Brooks, and others, to any of the imported stock I ever saw. The men named above are breeding bees for quality, and the bees show it by the large yields of honey they bring in, while the imported stock show that no care is taken in breeding them.

For the last twelve years I have been breeding for the sole quality of honey-gathering, and to-day I would not trade one of my best queens for any dozen of the best queens from imported stock I ever saw. What gives vitality to our stock is a direct cross rather than in-and-in breeding, and this is what gave the imported stock so much favor a few years ago. Prior to this time, parties in the U. S. had bred in and in for color, until a feeble race was the result; and, fearing that the Italians were to run out, some of them went to importing again. What was the result? The young queens from the imported queen mated with the drones from the home-bred stock, which gave a direct cross, thereby giving great vitality to the bees, and the cry was raised that queens from an imported mother were superior to those bred in our own country, causing it to come to pass that a breeder must advertise with a * in front of his name, if he would secure any patronage.

The claim, that hybrids were superior to Italians, came about in this same way, as here was a direct cross again. Fully realizing that this was wherein the matter of vigorous bees rested, I began, ten years ago, to purchase one or two queens each year of different breeders whom I believed had a good strain of bees for honey-gathering, this belief being founded on a good average report from their apiaries year after year. After purchasing, these queens were tested one year, together with two or three of their daughters, and, if found of value, some of such were used to partially stock the apiary with drones; and if any were superior, queens were reared from them to a limited number, never letting go of the advance I had made with my original strain, but, rather, keeping this ahead all the while by adding what of value I found in those I purchased. In these tests it more often happened than otherwise, that the queen I purchased proved so much inferior to my own that I was obliged to kill them, much as I disliked to do so. One case in particular which I recollect was where I purchased, at a very high figure, an extra selected tested queen which was so inferior as a layer that I did not use her at all. I kept this queen three years, and in none of these years could I coax her to lay in more than three Gallup frames, and the two or three queens I reared from her were little if any better, so I killed all of them. My original strain came from A. I. Root, about twelve years ago, together with a queen purchased in 1871 of Rev. H. A. King, then of Nevada, Ohio. Both of these queens lived to be over five years old, and showed such superiority that I have tried to perpetuate and improve upon it ever since. Then I added largely to the value of this strain by the queen of the "red clover" stock sent out by A. I. Root later on, which stock was of great value to cross with, although at the present time red clover does not blossom at all with us, owing to a midge in the head.

In the above I give the reader a little insight into the plan I have been working on, and I believe it to be the plan worked upon by many of those who are breeding bees for honey; at least, the bees produced by queens purchased from those mentioned above show that they are working on this or some other good plan. That the bees from imported stock are so variable, and show that no pains has been taken in breeding them, together with their lack in giving me as good yields of honey as do other queens, and those of my own, is the reason I have said, for several years back, that it does not pay us to import queens. G. M. DOOLITTLE.

Borodino, N. Y.

No doubt you are right in the matter, friend D.; but I am sorry you have not tested in your own apiary a larger number of queens received direct from Italy. The supposition has been, that nature has selected the fittest, on account of the comparatively

barren climate of Italy compared with our own, and we wish to know whether this accords with the general experience of those who purchase queens to stock their apiaries. To get at all the influence of a cross of the blood, we want, also, to watch the progeny of the queen herself, and see if that progeny has as much vim for honey-gathering as succeeding generations.

A REPORT ON WINTERING, FROM MRS. AXTELL.

Something in Regard to the Best Temperature for Successful Wintering.

A BEAUTIFUL SIGHT.

IN our bee-cellar is a sight I feel tempted to look at more than a second thought would tell me was best—that is, best for the bees. It is the nice large cluster of golden beauties, clustered nearly down to the bottom-board of the hives. Some are on the bottom-board, while others have, as winter progresses, gone up higher. One feels tempted, almost, to thrust in his hand and pat the little fellows. The small colonies seem to go up higher among the combs, and more dead bees are on the bottom. The large colonies that go nearly or quite to the bottom have no dead bees, but there is half a teaspoonful or more of very fine pellets scattered very evenly over the bottom-board.

The front boards of the hives in the cellar were raised from one to two inches to give larger entrances, so the bees could better throw out their dead bees; the brood-combs are also raised about one inch higher from the bottom-board of both the colonies in cellar, 74, and those outdoors, 61, as we had so many colonies last winter when taken from the cellar that the whole bottom was filled with dead bees, and sometimes up between the combs. Our hives, you know, are clamped at the corners, not nailed.

It is a real satisfaction to thus look right into the hives and see them look clean and well; for one can tell almost as easily whether a bee is sick or well as he can tell whether a person is well or not. I have an idea, that when a bee gets sick he crawls out of the hive to die, generally, as in the summer time, does it not? If the most of the bees that are dead upon the floor were healthy bees, then it seems to me it would be well to devise some plan to prevent their getting out upon the floor. Broad alighting-boards, with strips of tin around the outer edges, might do; or perhaps a better way would be as mentioned in Mr. Barber's plan—pile the hives up in one solid body; but, what would they do with the dead bees? It seems to me it must be very annoying and unhealthy for the bees to have a lot of dead ones in their hives.

We have kept the temperature in our cellar higher than ever before—from 40 to 45, and the bees crowded down to three and four combs, and on the sides of the combs, and on top, closely covered with oat or buckwheat chaff. We are surprised at the bees being so quiet at that temperature. I am satisfied we have kept them too cool before—about 36.

Since the last cold weather, we have had a fire in one end of the cellar, with quilts hung up against the ends of the hives, to keep the light from striking them, and to throw the heat over the top, so the nearest hives may not feel much the warmest. The weakest hives were packed nearest to where the stove is. The thermometer was sometimes in the center, and sometimes in the further end of the cellar. To-day it rose to 48, and yet the bees are quiet, occasionally a bee flitting out; but we have kept the sub-earth ventilator closed, and all other ventilation cut off. The heat from the stove makes the cellar feel comfortable, and the sides of the wall are not covered with frost, but are dry, which would not be the case with no fire.

My husband will report when he has made a more thorough test of temperature in the cellar and sub-earth ventilation. MRS. L. C. AXTELL.

Roseville, Ill.

I feel sure, my good friend Mrs. A., that a temperature above 40 will be better if you can keep the bees quiet; and I am quite sure I prefer 48, if not higher, unless a lower temperature seemed to keep the bees more quiet. When we wintered in the cellar, I thought more bees got out upon the floor when the temperature got up to 50 or 55, than when it was a little above 40. Your plan of giving abundant ventilation below, is something in the line of friend Green's article, if you will remember. We shall be very glad indeed to have further reports.

FEW OR MANY COLONIES: WHICH?

RED-CLOVER QUEENS, ETC.

I WAS much interested in Mr. Doolittle's article with the above heading on page 13 of GLEANINGS; but there are some points in his reasoning with which I can not agree. If he really advocates that the apiarist shall keep but 50 colonies in one apiary, and devote his entire time to the effort to produce large yields of honey, I would *not* agree with him; but if he means that the apiarist shall have several apiaries of 50 colonies each, I would agree with him.

Taking the first view of his argument, it has a tendency to make us believe that one swarm of bees, *if only large* enough, and expertly managed, would produce all of the honey the apiarist could dispose of! But, let us take 50 swarms, his lowest number, and see if the man who makes the raising of honey his only source of income, can make a satisfactory financial success of it.

We will take it for granted, that the person understands the secret of having his bees all in the best possible shape to secure the honey when it is secreted in the flowers. As I run my bees for extracted honey, and as my locality is perhaps not so good as Mr. D.'s, I will put my average yield, year in and year out, at 200 lbs. This would give me a yearly yield of 10,000 lbs. This amount, at the rate extracted honey is now selling at wholesale, would net me $500 per year. Now, an economical family could probably live upon this amount; but it has been said, that a person capable of successfully caring for 100 swarms of bees, or, if you please, 50 swarms, is capable of earning $1000 in some other pursuit; and I think every bee-keeper making it a specialty would not be satisfied with a smaller income.

Now, Bro. D. may clear much more than that amount from his small apiary of 50 or 60 swarms, because he has a large queen-traffic, and there is no need of his establishing another apiary; but if

he depended entirely upon his *honey* for an income, the attention he gives to queen-rearing would be well employed upon another apiary, if he had four apiaries with 50 colonies each, and obtained only 100 lbs. per colony; 20,000 lbs., at 5 cts., equals $1000. He would be better off financially than if he stuck to his 50; but if he can make his apiaries yield 200 or 400 lbs. per colony, he is so much better off. Again, 200 or more colonies would require but a slight increase of honey per colony to add many dollars to his pocket.

Every bee-keeper who has bees in different apiaries knows that a locality six miles away will yield, sometimes, much more than the home yard. To take advantage of these extra yields, the apiarist *must have* more than one apiary. Another reason why the apiarist must raise larger yields than 50 swarms can produce, is the cheapness of the product. It is now at a price where it seems it will not pay to adulterate it, and the outlook for the future gives us no hopes for higher prices.

A few years ago, and at present, there has been and is a cry against the small honey-producer. He has five or ten colonies of bees; and just as soon as he gets a box of honey he trots off to some grocery and trades it off for tea or sugar, at the grocer's own price, which is usually very low, thus setting the price for the specialist, who wishes to sell in the same town. But, let us look upon the other side, and see what the large producers are doing. Here is a man who has 800 swarms of bees in several apiaries. Perhaps it costs him $1000 to run those different apiaries; but his yield is 20 tons of comb honey. He can not afford to peddle it around to Tom, Dick, and Harry, but sells his entire crop for, say, 10 cts. per lb., thus getting a profit of $3000. Now "*I rise to inquire*," Where is your man with 50 colonies, trying to make a living out of them? Between the large producer and the small one he is ground to powder. The price for his honey is set by the former in the cities; by the latter, in his own town. He has got to continue his business with something else, or go into it deeper or step down and out. Every person who is making money in the bee-business at the present time is a large producer, or else is a large queen-breeder, or a large manufacturer of supplies. I speak for the present. Bro. D. speaks in a certain sense for the future. I hope the time will come when one swarm, if large enough, will produce tons of honey; but suppose we have an extra severe winter, or some other unexpected severity, our one swarm, or, if you please, our 50, will die—we are out of the business suddenly; but if we have 400 or 800, the chances are that we shall have 100 or more left with which to commence the season. We also find that those large yields of honey of from 500 to 1000 lbs. from single colonies are events of a lifetime. A few years ago B. F. Carroll, of Texas, reported nearly 1000 lbs. from one colony; but we may scan the pages of the journals as close as we please, and we don't hear of its repetition. It is just the same with nearly all of these immense yields. Our kind friend, the editor of GLEANINGS, obtained an immense yield from his entire apiary, and astonished everybody, long before GLEANINGS was born, and he even now occasionally refers to it; but we don't hear of his repeating it. Perhaps it is because from 300 to 500 colonies are kept in one apiary, and for this cause our friend has to buy California honey by the carload. But, Bro. Root, if it is such a fine thing, please reduce your apiary to fifty colonies, and give us another rousing report.

In the foregoing I have not entered into detail in relation to the cost of running an apiary for extracted or comb honey. My experience teaches me that it costs less in help, costs less in packages, less in shipping to market; the swarming fever is largely controlled, and I can sell honey in ton lots for 5 cts., if our comb-honey producers can for 10 cts., therefore if an apiary is run either way, the profits will be about the same; and with present methods and appliances, I think the large number of colonies, although they may consume 60 lbs. of honey per year, the little laborers are worthy of their hire, and are giving, in many apiaries, better results financially than the few.

As previously stated, Bro. D. speaks of the future, when the coming time and the coming bee will have arrived to stay. Even then, when that time comes, in whatever shape, round, rectangular, triangular, or reversible, or when the bee comes that will work upon red clover, and each one of our 50 colonies produces 1000 lbs., hundreds of bee-keepers will look over into the unoccupied field in an adjoining town, and, with characteristic enterprise, plant a successful apiary there; but the glorious day has not dawned, even though some claim to rear red-clover queens.

RED-CLOVER QUEENS.

I do not wish to impute actual dishonesty to the breeders. There may be a plausible excuse for them to so name their queens; neither do I deny that they have a valuable strain of bees. You will notice a remarkable coincidence. These queen-breeders all live in localities where red clover is raised for seed. The seed is secured from the second crop: this crop might be termed out of season, and, owing to the strength of the flower going to the production of seed, the flower is much smaller, and the secretion of honey much less, and the bees work upon it to a certain extent, but, we claim, not more than any other good strains of bees. I have even seen black bees working freely upon red clover.

It is, futhermore, a remarkable fact that the yields of honey in the immediate vicinity of these *remarkable* queens is not larger than in other localities. It would be a fact beyond controversy, and convincing, if the bees could obtain honey from the first crop of red clover, for each swarm would make such astonishing yields that every bee-journal would shout over it. The papers would hatch up a story about the bee-keepers making artificial red clover, and setting the roots in sweetened water. Bro. Doolittle could sit down under his own vine and fig-tree by the side of that 59 swarms, and sing pæans over his thousands upon thousands of pounds of honey. The reader will now bear in mind that this is a remarkable age. Every new thing should be investigated; and when you spend your hard-earned dollars for an article of which you have something as good, if not better, in your own apiary, you feel like saying right out loud, "Humbugged again."

J. H. MARTIN.

Hartford, N. Y., Jan. 29, 1886.

Friend M., in your estimate of the honey received from 50 colonies, you say nothing about increase of stock, and I believe it is generally conceded that as much honey can be secured with a moderate increase of stock as by holding the original fifty down to abso-

lutely no increase.—I think you are a little severe on red-clover queens, although I agree with you that, when the seasons are favorable, all kinds of bees, almost, work on red clover. In our locality, Italians, and oftentimes blacks also, are to be found on the red clover in June, almost as much as on white clover—sometimes more, although there are seasons when the bees work strongly on the white clover, and almost not at all on the red clover. I think I have often stated, that, in my opinion at least, most of our clover honey in Medina Co. comes from red clover. It is true, however, that when the white clover ceases to yield honey, the red clover ceases also, and occasionally we have a season when bees get honey enough in September from the seed crop of red clover to fill section boxes, although this latter does not happen, perhaps, oftener than once in five years, on an average. There are strains of Italians that seem to gather more honey in September than other strains, and we suppose, from the color and taste, that it comes from the seed crop of the red clover. The effort, however, to perpetuate a strain of bees that will gather honey from red clover at times when other strains do not, has never been very fully realized, so far as I can learn. Most of the bees from an imported queen, direct from Italy, usually gather more or less stores while the seed crop of red clover is in bloom.

I did not know that good honey was ever sold as low as 5 cts. for extracted and 10 cts. for comb. If any one has any good honey to be sold at those figures, I should be glad to take it off his hands, no matter how much there is of it; and if it is not too remote, I will pay freight besides. A pretty large crop of honey can be sold at retail so as to get 10 cts. for extracted and 15 cts. for comb honey in almost any locality, by taking a little pains; and I think it will pay almost any bee-keeper to develop his home market, *any* way.

CELLAR WINTERING.

UPWARD VENTILATION, LOWER VENTILATION, SUB-EARTH VENTILATION, ETC.

BRO. ROOT:—I'd give seventeen cents if you wintered your bees in the cellar. It may be best for you to winter on summer stands; but for many of us it seems best to winter in cellars; and if you did so, I am confident you would help settle a good many questions that would tend to make cellaring less uncertain. I should very much like to have your help on the ventilation question. Opinions conflict as to the necessity for any kind of ventilation, some seeming to consider it as *the* important factor, others thinking no ventilation whatever necessary. When we consider in what almost absolute inactivity bees may be kept, it would hardly seem necessary for them to use much air; and instances are on record, if I mistake not, where bees hermetically sealed, or apparently so, have remained in good health. Conditions vary so much that I am far from laying down as a fixed rule for others what may seem best for myself; but so far as my own bees and cellars are concerned, in spite of my theory as to their needing little or no air, observation leads strongly in the direction of their needing a change, and a pretty rapid change, of air.

UPWARD VENTILATION.

Formerly the absolute necessity of upward ventilation was strongly urged by many, and I think a great majority believed in it, although a few combated it. Of late, very little has been said about it. Three or four years ago I tried some hives without upward ventilation, and could not see that it made any difference; and for the past two years I have given no upward ventilation, mainly because it was more convenient to leave the hives covered up tight. I supposed I was somewhat heretical in my views, until surprised to find in the *Canadian Bee Journal* of Jan. 20, 1886, that a radical change of sentiment had been quietly going on in bee-keepers' minds; for in reply to a question on the subject not one of the fifteen who replied considered upward ventilation essential. The impression prevailed, that it made little difference where the air entered the hive, just so the bees could have it. My own hives are taken into the cellar with the cloths glued on tight, just as they were on the summer stands; but I have enlarged the entrances, so that, instead of ⅜, they are ½ inch in height, and the whole width of the hive. But if there is no good air in the cellar it is impossible to have it in the hive, so that hive ventilation is not so important to consider as

CELLAR VENTILATION,

About which comparatively little has been said. I may here mention some of the things that lead me to think cellar ventilation important. Please remember that I have now in mind cellars well filled with hives, piled five high. (When I had only eight or ten hives in the cellar there was no trouble about ventilation.) When I found the bees quite uneasy in former winters, I thought it was because they were too cold, and I was in the habit of building a fire in the evening. In the morning I found the bees nice and quiet, but was puzzled to find the thermometer no higher than it had been before I made the fire, which, being a wood fire, had died out in the night. If cold had made them uneasy in the first place, why were they not now uneasy with the same degree of cold? I came to the conclusion that the fire had hastened the ventilation of the cellar, and thus quieted the bees. Still, there may have some changes taken place, such as getting at their stores while the cellar was heated, leaving them quiet afterward, without any reference to the ventilation.

Toward spring, when the weather became warm and the bees uneasy, I opened the cellar doors and windows at night, causing great uproar among the bees when first opened; but by morning all were quiet, no change having taken place in the temperature. What, besides the change of air, quieted them in this case? Again, I noticed the bees were invariably quiet after a windy time, whether cold or warm; and a still, damp time was just as sure to make them uneasy. The shop cellar is without subventilation; and when the weather moderates, it is necessary to open the trap-door or window; but in zero weather no such necessity exists, although the thermometer in the cellar may stand just as high as in the warmer weather. The reason is, that, in the zero weather, the temperature is so much higher inside that the heavy, cold air outside forced its way through every crack and crevice, thus ventilating the cellar without any large opening. Now,

don't understand me to say that the whole secret of wintering lies in ventilation; I don't claim to know much about wintering, any way, and am far from thinking that perfect ventilation will secure perfect wintering. I merely think ventilation important, practical observation showing it more important than theory would lead us to believe. Nor is this disproved by citing occasional instances of successful wintering with no apparent ventilation, any more than occasional instances of wintering on five pounds of stores would prove the general practice of allowing only five pounds per colony any other than hazardous. Certainly no *harm* can come from having an abundance of good pure air in the cellar at all times.

Another consideration urging in the same direction is, that most bee-cellars are under dwelling-houses, and medical authorities inform us that grave consequences occur from impure air in cellars. If only a few bees are kept in a cellar it may not be necessary to make any special provision for changing the air, as enough cracks usually exist to allow a sufficiently rapid renewal. In this case, however, especial pains should be taken, both for the health of the family and of the bees, to see that no decaying vegetables or other matter should be left in the cellar, from which poisonous emanations may be constantly taking place. It is frightful to contemplate the amount of foul and decaying matter that is cleaned out of cellars every spring, if, indeed, it is cleaned out at all. Many never think of disturbing, until spring, the decaying mass, no matter how much noxious vapor is constantly steaming forth. The cellar should be thoroughly cleaned of every thing of the sort, and *kept* clean—fruit and vegetables of all sorts frequently picked over, and all decaying specimens removed. The cellar should at all times smell sweet and clean, and a good coating of lime or whitewash once or twice a year will help. If twenty or more colonies are kept in a cellar, special provision may be needed for renewal of the air, and of this I may have a word to say in a future number.

Since writing the above, GLEANINGS for Feb. 1 has come to hand, and your remarks about using sub-ventilation for greenhouses dashes my hopes in that direction, for I intended to make a great spread in talking about using it for greenhouses, henhouses, and perhaps even for dwellings; for if we need to heat the air for *any* purpose, it will certainly cost less to heat it from 35 or 45° than to take it lower.

I heartily congratulate Ernest's wife on getting a good husband. I don't know enough about her to congratulate him, but I suspect it is all right.

C. C. MILLER, 179—349.

Marengo, Ill., Feb. 3, 1886.

Friend Miller, with the variable winters we have here in Ohio, I can not feel that cellar wintering would be profitable to us, although I may be mistaken. I have thought several times I would winter part of them indoors and test the matter carefully; but I do so dread lugging hives out and in, and having things torn up generally, as we usually have where we carry them into cellars, that, to confess the truth, I am very reluctant to undertake it, especially while we have such excellent success wintering on summer stands, and coming out with such strong healthy colonies.—If we use no upper ventilation, it seems to me we must have some sort of protection to keep the frost from striking the substance that envelopes the brood-chamber. In old-fashioned box hives, where no upward ventilation is given, icicles sometimes form on the sides and top of the hives, as large as your arm. Now, an outer covering would entirely prevent this condensation of moisture, and freezing into icicles. In regard to bees wintering in hives hermetically sealed up, Prof. Cook did make some such experiments, but I feel quite sure there were some cracks and interstices in the hives, either through the top, sides, or bottom, that gave them plenty of air. It is with hives as you aptly mention with cellars. When we have weather below zero, the air pours with great force through cracks and crevices that at ordinary temperatures would be called air-tight. I would have the cellars ventilated, anyway, whether the bees wintered well without ventilation or not. It may be that some cellars, on account of natural circumstances, are already sufficiently ventilated, without ventilators or sub-earth pipes. This might be the case in sandy soils; but in our water-soaked clay soils, in the winter time, it seems to me ample arrangements should always be made for ventilation. The point you make in regard to saving fuel and saving food by bringing fresh air into our cellars, greenhouses, and dwellings, after it has been warmed many degrees by the earth, is certainly a very important item—yes, for the hen-houses, horse and cattle stables, and everywhere where we keep domestic animals. Zero air and ice-cold water is a great waste of animal heat, and, as a necessary sequence, a waste of grain and other food products. Friend Terry, in his forthcoming book in regard to the care of domestic animals, will give us some grand new thoughts on this subject.—Our discussions in reference to the temperature of Mother Earth, sub-earth ventilators, etc., have a value that is going far beyond the wintering of bees, alone.

THE YAZOO VALLEY, OR DELTA.

ITS HONEY RESOURCES.

ONE of the most interesting sections of Mississippi is the Yazoo Delta, not only in respect to its general agricultural capacity, but also to the bee-keeper for its honey resources. I have been acquainted with this part of the State from my youth up, my father having moved, when I was a small boy, from East Mississippi, with his slaves, and opened a plantation on the Tallahatchie River, which plantation I still own, and rent in part to the slaves, now freemen, who formerly cultivated it. I, of course, never made observation in the country with reference to its honey capacity until I became acquainted with bee culture. Until 1876 I knew nothing of bees, only as insects placed at a remote corner of the yard or garden, and to be severely let alone except occasionally, when robbed to obtain a dish of honey for the table. In that year I casually obtained a volume of "Langstroth on the Honey-Bee," and since have, when on my plantation, been carefully noting the honey resources of the "Swamp," as we commonly call it. I have

known of large apiaries of black bees down there in common box hives, and have seen some beautiful white honey; but nothing is known, as a rule, of modern bee culture, the Italian bee, extractor, movable-frame hive, etc. Dr. Blanton and a few others keep bees scientifically, in this valley. My conclusion from my observations is, that its honey resources are immense; and my aim is to establish an apiary there as soon as practicable. As honey is a very general product of nature, it might be expected that a country with such exuberant forest growth, and inexhaustible and unsurpassed fertility, should yield largely the vegetable nectar which the bees refine and evaporate into honey. The climate, too, is highly favorable to large secretion of honey each year, without fail. The Swamp is pre-eminently the cotton section of Mississippi, but I have never known bees to gather honey from cotton to any extent. The cypress and willow and honey-locust and black gum are very abundant, and yield much honey. The rattan is everywhere, and is alive with bees in early spring. Attracted by the hum, I have at times stopped, spellbound, for a long while to watch the bees gather honey from this plant. The cross-vine, or swamp woodbine, is very luxuriant, and its rich festoons of white flowers hanging from tall trees furnish much forage to the bees in midsummer. But my attention has been most attracted by the tupelo gum. This is a tree with large base, but with small, tall, and tapering body above, that grows only in very rich sloughs, where the roots are under water. The flowers are white, and grow in large festoons. They send out a delicious fragrance to a long distance upon the air, and yield much beautiful white honey. I might also mention the persimmon, hackberry, and other trees and plants; but the above enumeration will give a general though very imperfect view, for doubtless there is a vast number of plants that yield honey that are not yet compassed by my knowledge.

I may add in conclusion, that there are very bright prospects in every way before this valley. The levees are in good repair, a fine railroad runs through it on the west from Memphis to Vicksburg; the Illinois Central R. R. is building a branch from Yazoo City up the Yazoo and Tallahatchie Rivers to Memphis, and another road will connect these two. Thus the whole valley will be intersected by railroads; the Father of Waters will be kept within bounds, and we who are interested say the valley will become very thickly inhabited, and will be made the garden spot of Mississippi.

Grenada, Miss. OSCAR BLEDSOE.

FLORIDA, AGAIN.

THE PROSPECTS AFTER THE LATE FREEZE.

I HAVE often used the columns of GLEANINGS as a medium through which to encourage good men to come to this State to look up the bee-keeping interest here, and, in consequence, many have come and made happy homes; others, coming with great expectations and little "sticktoativeness," have been disappointed at first glimpse, and returned north, to regret their hasty decision. Still others, after coming here and taking a fair look at the State, have decided that, all things considered, they had best remain where they are, rather than make pioneers of themselves and have to put up with all the inconveniences to be met with and endured in "growing up with a new country." I have always endeavored to convey as correct ideas of this country as possible in all my writings; and for fear that many might, through the writings and advertisements of unscrupulous land agents and speculators, have formed ideas respecting the State that would cause them to see more encouragement in my letters than I intended to convey, I have always advised a visit of inspection before disposing of valuable property elsewhere. Notwithstanding this advice it is not uncommon for me to receive letters from parties north, stating that they have sold their real estate, packed their household goods and bees into cars, and are to start for this State within a day or two. Such people seldom have their expectations fulfilled, and yet I am blamed for their blunders and lack of judgment.

The object of this article is to say to all, Do not do this. At any time it is a dangerous experiment, and at this particular time it is almost sure to bring disaster. We have just passed through the coldest spell of weather that the writer or any of his acquaintances have yet seen in Florida. Fifty-one years ago there was a similar freeze, a little later in the season, and perhaps the mercury took a little lower dip, that killed all of the mangrove and orange trees throughout the northern half of the State. This has doubtless killed a large part of the mangrove, but just how much can not be told as yet. Messrs. O. O. Poppleton and Jesse Oren, of Iowa, both well known to the readers of your journal, and myself, went out to some of the islands in the river during the last day of the cold snap, to see what the effect had been, and, to the best of our combined judgment, about four-fifths of the mangrove was destroyed. This being the case, the bee-keepers of this section can not expect a large crop of honey this season; and whether or not the next two or three years will give much better crops, will depend on whether or not the roots are killed as well as the stock. How far south of here the devastation extends, I am not able as yet to say; but as Mr. R. S. Sheldon, of New Smyrna, intends to start south this week to find a location for his bees after the early bloom is over here, we shall probably know after a while.

Our oranges are all frozen that were left on the trees; but although the mercury went down to 20° above zero, the trees appear to have come through all right in this section. The cold spell has destroyed a good deal of property, and proved to be a very serious matter with many; but it neither caused loss of life or destroyed buildings, as blizzards and earthquakes do, and is much less likely to recur than either of them would be in countries subject to them. I accept it as a part of the programme of life, and shall go on with more confidence in this country for orange-growing and bee-keeping than ever before. W. S. HART.

Hawk's Park, Fla., Jan. 18, 1886.

Friend Hart, I thank you for your caution to the people who get the Florida fever, or any other fever, and pull up stakes, take family, bees, and all, and start, before the head of the family has even gone ahead to reconnoiter the ground. Some of you may remember our friend Damkohler, who wrote with such enthusiasm—see GLEANINGS for 1883, p. 377. Well, a letter is just at hand mentioning his wife's death, and that he is alone with an infant and a family of small children, himself worn out with fatigue, and almost ready to give up, away off in the wilds of Florida.

WHAT TO DO, AND HOW TO BE HAPPY WHILE DOING IT.

Continued from Jan. 15.

CHAPTER IX.

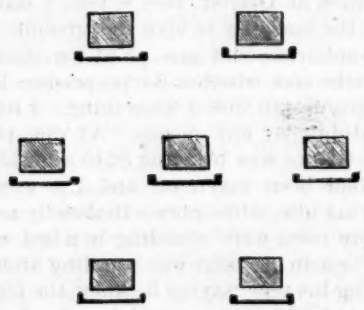
He which soweth sparingly shall reap also sparingly.—II. Cor. 9:6.

The above text does not, perhaps, cover the ground of this chapter, but it comes nearer to it than any thing else that now occurs to me. The point I wish to touch on in this chapter is this: After having once prepared our ground nicely for a crop, we want to be sure the crop is put on to it. In our best books on market gardening we are told how many plants can be put on an acre. For instance, Landreth's earliest cabbage is so small and compact that 15,000 may be grown on an acre. Now, real nice fine specimens, started in a hot-bed or greenhouse, so as to produce heads in June, ought to bring 10 cents a head. This would make $1500 for an acre of cabbages. If these figures are too large we will suppose they will bring 5 cents a head, which will be $750 per acre. Last June we got 20 cents a head for all the early cabbages we had to spare, which would be $3000 per acre, providing we had a market that would take the whole of an acre. Now, what is the trouble with these figures? Why, the trouble is this: 15,000 heads *could* be grown on an acre, providing every inch of the ground were brought up to the highest fertility, and providing, also, that the plants were set at mathematically correct distances; that is, each plant should be just so far from its neighbor, and no further, and there should be no vacancies. This last matter of vacancies is what I wish to speak of now. Farmers, gardeners, and almost every one who works in the soil—from those who get a dollar for the product of a square yard in the greenhouse, to those who get only a few dollars an acre from their crops out on their farms, all waste time and money by not having their ground thoroughly and *accurately* seeded. What I mean by "accurately" is, that just the right number of plants are put upon an acre—no vacancies, no crowding, and no getting too far apart. It seems to me there is no tool on the farm that is so far behind the times as the marker. The seed-sowers do better, but it seems to me that these can be greatly improved. With the wire-check row, and careful management, there is a pretty good prospect for a full crop; that is, for about all the ground will do; but to go over our farms as we ordinarily find them, my opinion is, that, in this matter of seeding alone, it is a common thing to lose half the crop.

TRANSPLANTING.

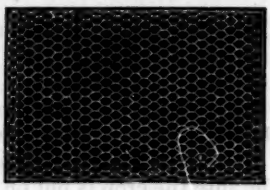
Now, if this matter of preparing the ground nicely—manuring it and all, and then not getting a crop on it because a plant has not been made to grow where the ground was ready for a plant, is expensive business, it is still more expensive to prepare ground for a greenhouse, and go to the expense of glass to put over it, and steam-pipes and fuel to keep it warm, and then not have every square inch occupied, not only every day, but *every hour*, with some sort of a plant. During the convention of the bee-keepers of our nation at Detroit, Dec. 9, 1885, I started out in the morning to visit the greenhouses in the suburbs; and one point I wished to determine was, whether the proprietors kept their ground all doing something. I found they didn't, by any means. At one place where lettuce was bringing $2.00 a bushel, a crop had been taken off, and the ground was lying idle, while plants that sadly needed more room were standing in a bed near by. The man in charge was standing around, smoking his pipe, saying he knew the plants ought to be in that ground, but he hadn't got around to it. Now, *I* should want to see the ground nicely fitted, and more plants growing, in the place of those taken out, within *one hour;* and under such circumstances I would take up the young plants with a good ball of dirt hanging to the roots of each, so that there should be no stoppage in the growth—in fact, take *all* the earth to a depth of one or two inches, along with the little plants when they are taken up. Then they have no check, but find themselves already growing, spread apart so the leaves that have been struggling for light and air can, any of them, have a nice little space to fill up with nice crisp foliage; and not only did these men let the ground lie idle while the December sun was pouring down through the icy sash, but when they planted them out they did it in such a slipshod way that some of the little plants had nearly a foot of room, and others, perhaps, not six inches. I would have decided just how much room I wanted for lettuce-plants to occupy, and

then, in view of the expense of the space it occupied, I would have them at exact distances. Do you say, "This mathematical accuracy is all very well to talk about, but it won't pay in practice"? Just wait a bit. I suppose most of my readers are familiar with the quincunx plan of planting fruit-trees and other things where we want to get as much room as possible for each plant, and still have the ground all covered. It is simply adopting the plan the bees use in building their cells. Where an orchard is planted with the trees in squares, there is quite a space in the center of each square, comparatively unoccupied. Fruit-growers sometimes put a peach-tree in this center. A much more economical way is the plan of which I have spoken. It is, to have each plant or tree the center of six, and the six are at exact distances from each other. The cut below, taken from our A B C book, will explain this, only that was made for bee-



hives and grapevine trellises. You can suppose each hive to be a cabbage-plant. The cabbage-plant sends out its leaves, usually, in pretty nearly a circle. When they get so they crowd each other, these circles will so adapt themselves as to pretty nearly cover the ground; each one being squeezed a little against its neighbor, would give exactly the form of a cell of a honey-comb.

How shall we get our plants set like this without too much expense? Well, the plan of sowing things in drills, if the plants could be made to "break joints," as it were, would accomplish it; but even if they do not break joints, it is, I think, as a general thing, rather ahead of the hill system, unless, indeed, we have a wire-check rower to place the hills so they break joints exactly, and make a corn-field look like the above figure. Then I should want seed enough put in so that each hill can have exactly the right number of stalks and no more. There is probably no method of accomplishing this latter, except thinning. In setting out plants, however, we can do it just as well as not; in fact, with the little device figured below, and which is, so far as I know, my own invention, we can do it *better* than not.



TRANSPLANTING-FRAME.

The above is made by stretching a piece of poultry-netting over a frame of half-inch iron. I would have this frame made of *iron* instead of *wood*, because iron, by its weight, stays right where it is laid, and is not easily moved around, even if you hit it with your hand while transplanting. You see, if you should give it a hitch after a part of your plants are put in, it might be difficult to get it back into its place again, and this would spoil the symmetry of your rows. In use it will pay, perhaps, to have two sizes of these frames. One of them is two feet wide, and just long enough to lay inside the side-boards of the benches in our greenhouse. The other just drops inside the boxes we pictured on page 60.

Now, then, when your seedlings, such as we told you how to grow in the chapter before this, have got so far as to show the third leaf, and begin to look somewhat crowded, take them up with the fibrous moss, or peat, I have described, adhering to the little rootlets, and plant each one in the center of one of the meshes of the frame. Our method of transplanting is to take a little wooden stick, the size of a lead-pencil, or a little larger. Instead of having the end of the stick a sharp point, however, let it be flattened so as to be perhaps a fourth of an inch wide at the point. Lay the plant in the center of one of the meshes, and with this flattened point of wood push it clear down to the first leaves, then with the same stick press the soil around it. When you finish the box, take a watering-pot with fine a rose and soak the soil so as to have it settle all about the little rootlets. If you do your work well, not one in the box should fail. The soil to be put in these boxes to start the little plants, should be much like that prepared for the seeds. An inch of fine old manure in the bottom of the box will be quite a help. When they get too much crowded, plant them out in the same

way in larger boxes, or in the open ground. By this time, take every other mesh of the transplanting-frame, and, if you choose, every other row in the meshes, according to the size of the plants and their habits.

We work in this way, cabbage, cauliflower, kale, lettuce, celery, and tomatoes. You will see, we have absolute mathematical regularity, and with no waste ground. When the weather is suitable to work in the open air, use the same frame there. But I would have all my plant-beds, outdoors as well as in the greenhouse, made of very deep rich soil; and if it is soil that will bake over, put on enough peat to cover the surface—at least, to do entirely away with baking. We can not tolerate a hard crust around our plants, nor over our seeds. Your plants will be all the better and all the stronger if they are transplanted *twice* before they are put out in the field.

Some may ask, "Why this laborious transplanting?" Several things are accomplished by it. First, we get a stronger fibrous root than can be secured well otherwise. Second, we economize space. In one of the boxes I have described, you can keep about 2000 little plants until they are two or three weeks old. When transplanted by the frame, these same boxes will hold about 140 plants each. They can stand in this box until they are ready to go into the open ground, as a rule. With celery, and some other plants having a great mass of fibrous roots, we can, when the time comes to transplant for the field, turn out the contents into one fibrous sod of matted roots and soil. This sod may be handled as you would handle a door-mat. Lay it on a smooth board (such as a hive-cover, for instance), and take a long butcher-knife and slice the plants up into little squares—or, rather, little hexagons. Each one looks like a potted strawberry-plant, and you can plant it out in good soil, and have it grow without a single failure of a plant, or any check, by transplanting. The White-Plume celery that we have been selling for six months at such good prices was all raised and transplanted in this way. A good hand will transplant 500 seedlings into boxes in an hour; and where the soil is just right, he can put nearly as many in the open ground; so you see that transplanting is not such very expensive business, after all. In the greenhouse, you have your box on a table of the right height, so it is not nearly as fatiguing as working on your knees in the open air.

The third reason in favor of transplanting over sowing the seed is, that in transplanting you get the plant where it ought to be, and no failures; whereas, if you sow the seed this would be next to impossible, without a very expensive thinning-out. Last, but not least, we get our plants large and strongly rooted, in full vigor, and ready to go into the ground the very day some other crop has been marketed and sold. We also have the plant prepared to take right hold on the manure—that is, you need not purchase your manure, if you have to buy it, until the plants are ready to take right hold of it. You see, you have the use of your money longer.

FILLING IN WHERE PART OF A CROP HAS FAILED.

For a good many years I have been in the habit of planting over where the seeds did not come up. Sometimes we plant corn again where a hill has failed; at other times we put in a cabbage or tomato plant. Later in the season, white beans, etc. Now, I have come to the conclusion lately, that I want no more mixing up, if it can possibly be avoided. Suppose we have an order for green corn, when the crop is about exhausted. I tell the boys they can get some nice corn by hunting up the hills that are planted a second time; but the job of hunting is more than the corn is worth. Going over the field for here and there a few tomatoes, is about as bad; and even going over the farm to gather the white beans that have been put in waste places is a good deal the same way. The boy who is sent gets only about half of them. I tell him to go out again, and then find a lot missed. I want, if possible, the whole ground occupied with one crop, and I want that crop to ripen all at once, as far as possible. When it is all ripe, I want to be able to clean the ground and prepare it for another crop, and so on; and in no other way can this be done so well as by transplanting—that is, such plants as are usually worked in that way. Last season I transplanted corn and cucumbers, and made a success of it too. In this way I had no vacant hills, and yet my plants were all of one age. With the cucumbers we dug a good-sized hole, then divided the hill with a spade while another hand with a shovel cut under so as to take a large shovelful of dirt, plants and all. Scarcely one of the transplanted hills wilted where it was done carefully. Of course, this will pay only with crops such as market gardeners raise.

CHAPTER X.

By wisdom is a house builded.—PROV. 24:3.

Well, friends, very likely we shall need a deal of wisdom in building some sort of a structure to keep the frosts of March and April away from our little boxes of plants, even if we don't have very many of them, nor need very much of a protection. Your plants are taken up from the seed-bed where they grew, and planted two inches apart, according to our directions in the last chapter; and the next thing that comes up is, "Where shall we put the boxes?" If you have plenty of windows opening into a warm room, they can be set around the windows or in front of them; that is, a certain number of boxes can, and they will do this way tolerably well until warm days come so you can put them out. Of course, you must turn one side and then the other to the light, to make them grow straight up. If you get them very far from the window, you will find that, in their efforts to get to the light, they will not only tip over sidewise, but they will stretch their necks, as it were, and thus get long-legged, or "drawn," as gardeners call it. Well, suppose the windows do not answer for the quantity of plants you have got nicely started, what then? Why, you must put them outdoors in a hot-bed or cold frame; and in making even a simple structure like this, we want to scrape up all the knowledge we have gained in regard to heat, light, ventilation, etc. Our cold frame or hot-bed must first have a sunny place—a southern slope; that is, a piece of ground sloping slightly to the south is what we want. Next we want to protect it from the winds by tall buildings, if we can get such a place; but if not, a tall board fence, or something of that sort. High hills and overhanging rocks are, of course, better than buildings or any thing else, if you can get them. Have the tall buildings, overhanging rocks, or high fences, on the north and west, if possible. A similar protection on the east will make it still better, so you see a gully fronting south between two hills would be about the thing. Of course, you want a protection on the north to keep the north winds from coming down this gully. A building would probably be the best thing. I used to think, that *under* an overhanging rock, or under a shed, would be just the place—the shed, of course, fronting the south. The objections to a shed are, that it cuts off the light, making the plants have a tendency to turn off southward, and stretch themselves up, as I said above. From this, we see that, whatever covering we have, it must be glass so as to admit light. Even the north roof, that the sun never shines through, must be transparent, to get the best results.

Having chosen our location, we will consider the simplest form of a plant-bed. The smallest size usually made is that of a hot-bed sash, generally 3 x 6 feet. In order to avail ourselves of the heat of Mother Earth, we will dig down, say, 18 inches into the ground. To keep the dirt from caving in upon us, put in a wooden box 3 ft. 1 inch by 6 ft. 1 inch, say, outside measure. The sides of the box may be, say, a foot high. If the ground is frozen when you commence, you will have to chop it out with a pick or an old ax. When you get some fine dirt, bank it up around your pit, but let the bank be at such an angle that it shall not prevent any of the sunshine going clear to the bottom of the pit. These directions are for the *south* side; but if you have a slope around the other sides about the same, it will be all right. After you get it dug, put on your sash and wait until the sun shines enough to thaw out the interior by going through the glass. If the sash is placed at an angle so that it faces the south, it will heat faster, but this is not very material. The large cold frames and hot-beds, at Jersey City, near the city of New York, have the sides almost level. Perhaps the south side is an inch lower than the other—may be two inches, but the slope is so little that I could hardly notice it. They used plank for their supports to the sash, and the plank were planed on top so as to be perfectly level, so the sash shuts down as nearly air-tight as possible. When a sunny day comes, so that the ground is thawed up inside, you can remove your sash and put in boxes of plants. Now, then, you are to watch them and take off the sash whenever it is not freezing weather outside. Sometimes a cold wind will harm the plants when it does not freeze. In such cases, keep on the sash, tilting it up a little to prevent the plants from getting too hot. The temperature inside is best not lower than 40°. Peter Henderson gives the rule for lettuce, cabbage-plants, radishes, etc., as 50° at night and 70° in the daytime; so when your thermometer shows 70° you want to be on hand and tilt your sash. If the sun is shining, and it is not freezing outside, take the sash off entirely. The clear rays of

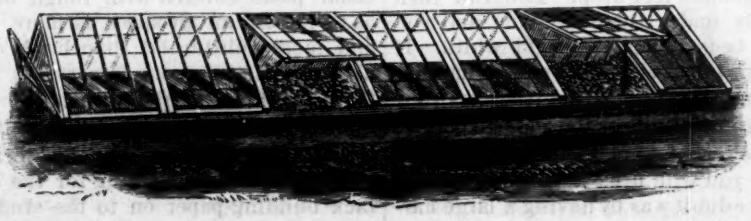
the sun, without any sash at all, are always better, if the plants do not get too cold. If unusually severe weather should occur, and continue for some time, you will need to put a shutter or straw mat over your sash. If that does not do, cover the joints with coarse stable manure—straw or litter of any kind. Leave this on until the weather moderates, and then gradually take it off. After your plants have become a little used to frost and cold air, after being taken out of the house, they will stand quite a freeze without injury; that is, even if the ground should be frozen over the surface, you will find the plants will come out all right. In fact, what are called cold-frame cabbage-plants are raised in the fall, and wintered over without injury, even where the thermometer goes down to fifteen or twenty degrees below zero.

As a rule, there is very little if any growth with any of these plants while the temperature is 40° or lower. Some plants will make some growth at 45°, and others will make a slow growth right along at 50°. Plants that are accustomed to grow at 50° become very hardy, and will stand severe freezes without injury. When it comes time to raise tomato-plants, peppers, and other tender vegetables, you will need what is called a hot-bed. This is simply a cold frame, just such as I have described above, with the addition of heat obtained from stable manure placed underneath the plants. Get stable manure that has begun to heat, or while it is hot. Fork it over and break it up fine, then put from one to two feet in your pit, under the boxes of plants. This will give heat enough to start seeds, even in the month of February, in our locality; but the cold frame will also start seeds without much trouble, in the month of March, say during ordinary seasons.

If you want a larger cold frame, of course all you have to do is to use more sash. In the figure below, we show you one we use with great satisfaction, composed of fourteen 3x6 sash. The sash is called 3x6, but it really measures 3 feet and 4 inches in width, from outside to outside.

Its location is on a level piece of ground, with our factory buildings on the north and east side. On the west we put up a tight board fence seven feet high. The outside of the frame is simply 2-inch joists about six inches wide, set up edgewise, and held in place by oak stakes two inches square, driven in perhaps two feet. We used about five stakes on a side. The inclosure is 11x23½ feet. Inside, the ground is made rich to a depth of perhaps 18 inches, with stable manure, peat from the swamp, and good rich soil. We found it not only laborious business to handle so many sash, but somehow or other, every time the sash were taken off and put back again, more or less glass was broken. It occurred to me that some arrangement might be made, obviating the necessity of taking off the sash; and at this date, Feb. 10, it seems as if my plans were a perfect success. The cold frame is full of beautiful cabbage, cauliflower, and lettuce plants, and not a plant has died. Shall I tell you how I manage it? You will notice the gable end is made like a door, hinged at the bottom, so it tips back. Well, when it gets too hot inside we open the doors at each end. This lets a draft of air right through; and even during very hot days the draft keeps the plants cool enough, even though the sash are all left in their places.

Of course, there must be some kind of a ridge-pole to support the sash at the top, and this is simply a strip of ⅞ board about 4 inches wide, supported by rafters made of pieces ripped from a two-inch plank. These pieces are about 2½ inches wide, set up edgewise. This makes the rafters 2 x 2½ inches, and the stout oak stakes driven into the ground prevent them from spreading. When in place, each sash laps one inch on to a rafter. Well, we found by trial that a heavy wind would blow the sash over and break the glass. To prevent this, we attach each pair of sashes to each other at the top, by a hook and staple made of galvanized iron. This allows them to be quickly moved and quickly fastened when put back in place. It

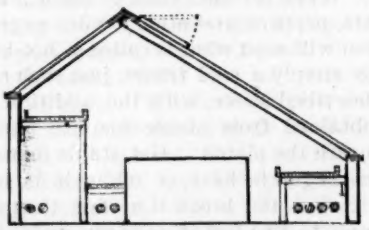


A COLD-FRAME FOR WINTERING OVER CABBAGE, CAULIFLOWER, LETTUCE, ETC.

also allows the sash to be tilted up, as shown in the engraving. We tilt them up to get out or put in plants, or give them water. When you have much sunshine, the beds will get very dry, and they must be watered, either with a sprinkler or a fountain pump; or you can pour water on, by being careful so as not to wash the plants out of place. However you do it, wait until they begin to show they are needing water, and then give the beds a good soaking. The very best way in the world is to take the sash off whenever there comes a rain. Whenever it is raining in the winter, and not freezing, the sash ought to be off. It is, however, less trouble to water the plants by hand, many times, than to take off the sash. We were annoyed last fall by the cats getting in nights, when the end-boards were left open, and scratching in the soft mellow earth. We stopped this, however, by covering the gable ends with poultry-netting, put on in such a way that the doors could be opened and closed without trouble.

Perhaps you may want to know what advantage cold-frame plants possess over plants raised in the house or in the greenhouse. As a rule, they are much stronger and hardier. As an illustration, we are today, Feb. 10, planting cold-frame cabbage and lettuce in the open ground. They have been greatly hardened, until they will stand almost zero weather without being injured in the least; whereas a plant raised in the greenhouse, without this hardening process, would be killed out with a freeze of 15 or 20 degrees. Plants may be raised in the greenhouse in February, and hardened by opening the cold frame, and exposing them gradually.

Now, it may occur to you that the cold frame just described could be very easily made into a very pretty little greenhouse. So it can, and our first greenhouse was made in that way. Just build the structure so one end comes up against a cellar window to your dwelling-house, and you have it. Cut the window down low enough so it will do for a door, then make a ditch or trench through the center of the building, 18 inches wide and about 3 feet deep. You can then walk easily under the ridge-pole, and you will have beds about the right width. If your walk is two feet wide it will be handier to get by another person, but it wastes your precious ground inside of the glass structure. Now, if you want to make the plants grow all winter you will need a little fire heat. The way we did it was by having a large barrel of water at the end of the cold frame, opposite the door. A steam-pipe went up one side of the path to the barrel of water, and down the other. When a cold night comes, heat the water in the barrel, by means of the steam-pipe, up to about the boiling-point, and it will keep your greenhouse free from frost all night. The evaporation of water from the barrel soon coats the inside of the sash with half an inch or more of frost, and this frost also closes all cracks and crevices with ice, so as to make the room air-tight during a severe freeze. You can have the surface of the ground for your beds, or you can have boxes, such as I pictured in Chapter VIII. The boxes are handier, because you can carry them with the plants right where you want to put the plants out. But, suppose your business demands a larger greenhouse than this cold-frame arrangement. Well, you can make it longer, or place another, just like it, right by its side. The latter plan has been the one advised until within a few years. Peter Henderson, however, of late uses a structure something like the figure shown below.

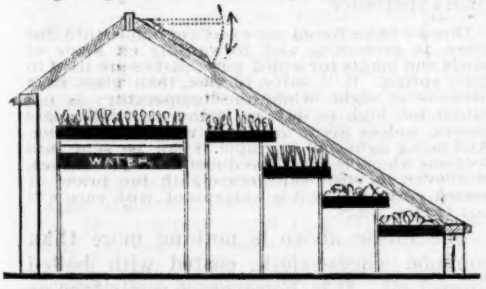


HENDERSON'S NEW METHOD OF BUILDING GREENHOUSES.

This building has one long side of sash, facing the south, as you will notice. This long side is about three times the width of the sash, on the north side. For instance, if you use six-ft. sash on the north side, you will want rafters about 18 feet long on the south. This makes the north wall a good deal higher than the south wall. One would naturally suppose that these walls should be made of brick or stone; but Mr. Henderson states, and I think he is right, that a wall made of cedar posts, covered with rough boards, so as to inclose an air-space, is more effective and more substantial than brick or stone. To make it still more impervious to frost, there should be a tight covering of common tarred building-paper between the two board walls. We use matched ceiling for the inside, and drop-siding for the outside; tack building-paper on to the studding before the siding is put on. Where the build-

ing-paper is spliced, a strip of wood should be nailed across the joint, so that no cold air can get through anywhere. The interior of the house shows three benches for plants, and two walks. The first, or south bench, is the lowest of all; the middle one a little higher still. You will notice, that under the lowest bench are four steam-pipes for heating purposes. Two more are seen under the walk, next to the tall bench, and two more under this bench. It seems a little strange, but it is nevertheless true, that the coldest place is to the south side, over the low bench.

Now, it is laid down in our works on greenhouses that plants do better, the nearer you get them to the glass. To take advantage of this, Mr. Henderson, in his new style of house, raises them as he goes back. I knew this was a fact, but I didn't know until the present winter that it made such a very great difference. Almost every box in our greenhouse seems to indicate, as plainly as words could tell it, that they want to be close to the glass. One of the standard works on greenhouses says no one has yet ever been able to explain *why* this is so. Plants away from the glass keep reaching up and growing long-legged, as I have told you; whereas, when they are close up to the glass they seem satisfied; they put on a dark rich color, and grow stocky and short, the way we want them to. To test the matter thoroughly, we tried boxes in different positions, and rigged one of our greenhouses so as to be pretty much like the figure shown below.



PLAN OF A GREENHOUSE, AS PREFERRED BY THE AUTHOR OF THIS BOOK.

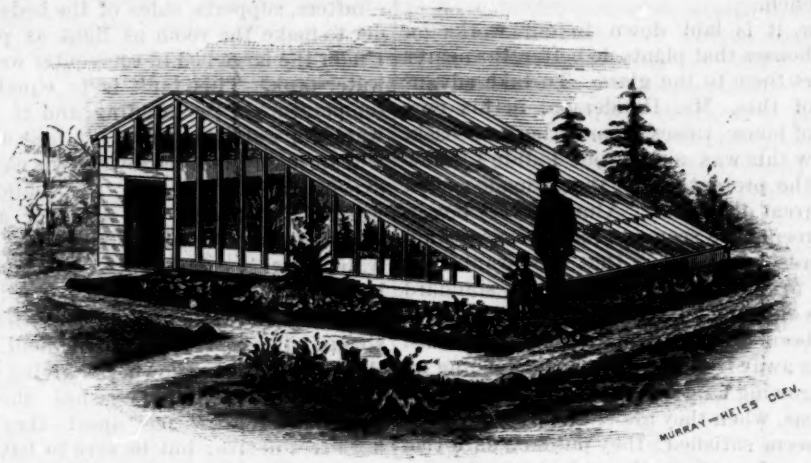
You will notice in the above, that the first bed is much like Henderson's. It is, however, to be only 2½ feet from the ground, the south edge coming close to the glass, just allowing the plants room to grow. The next bed is just two feet higher up; and if you call the thickness of a bed six inches, this upper one is just four feet from the ground or floor, obliging one to stoop over when he wishes to get at the lower bed. As he has, however, 18 inches of space between the upper bed and the lower one, he can work very conveniently with his head bent over, as it would naturally come while working in the lower bed. The third bed comes two feet higher than the second; the fourth about two feet higher than this, which would bring this last, and also the center bed, with its upper surface, 7½ feet from the ground.

The supports for these beds may be straight-grained pine or ash, or, better still, gas-piping, for we want just as little shade as possible. Every thing should be painted white —rafters, supports, sides of the beds—in order to make the room as light as possible. Under the large bed in the center we have a water-tank. This tank is to equalize the temperature of the building, and to furnish water for watering plants. A hose attached will sprinkle the three lower beds easily and expeditiously. Whether the building is warmed by steam, hot water, or a flue, I would arrange it so as to heat this body of water on very cold nights. The water may be procured from the roof partly; and, if steam is used, from the condensation of the steam. The roof is all permanent, except the hinged sash shown, for giving ventilation. The ventilating sashes should be placed about three feet apart—they may be 3 x 4 feet in size; but be sure to have them lap *over* the other sash, not to go down between them. When they get covered with ice, you will know why. In regard to the width of the beds, we have decided on about 3½ feet. The operator can work handily this distance, if he is just the right height from the surface of the bed. To get this height, and have it always just the same, and still not be cumbered with elevated walks, we use an invention of my own, figured below.

MOVABLE STEP TO HANG ON THE SIDE OF THE ELEVATED BEDS.

An explanation is hardly needed. The board is 3 ft. long, 6 in. wide, and ¾ thick; the irons can be made by any blacksmith. For a

man 5 ft. 8 in. high, the distance from the hooks to the surface of the step should be about 2½ ft. You can get the most convenient height for reaching and working across a bed 3½ feet wide by blocking up a plank until you get it just where you want it. The center bed is 7 feet wide, so you can stand on either side. I would have 18 inches between the center bed and the wall, and between the two upper beds. The building may be of any length you choose. I would suggest not less than 25 feet. Below is the cut of our own greenhouse made last fall.



OUR GREENHOUSE, FOR RAISING LETTUCE, RADISHES, CELERY-PLANTS, CABBAGE-PLANTS, ETC.

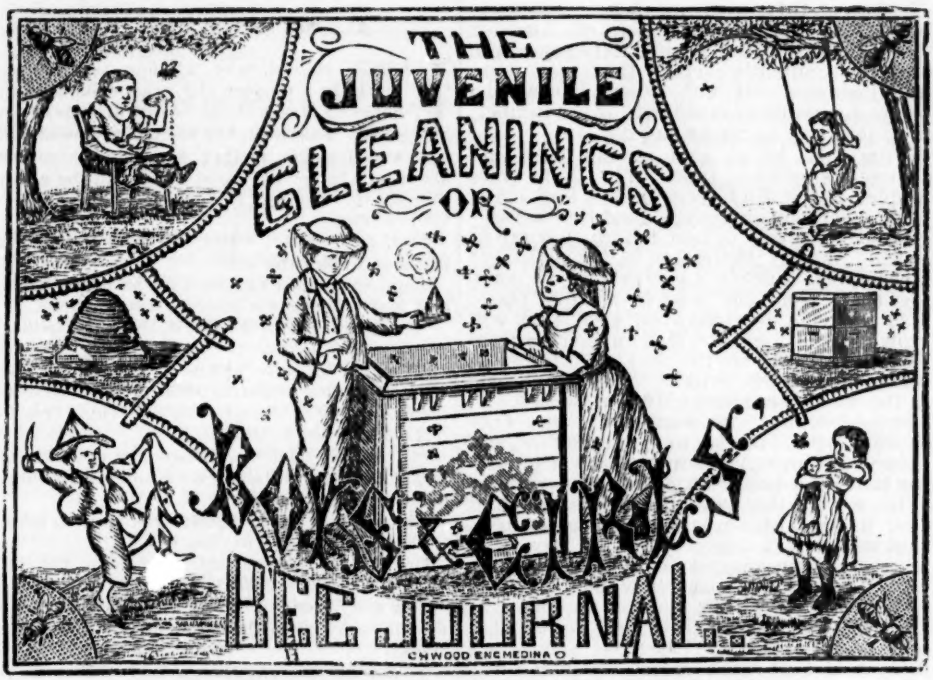
This building was put up last fall, and the work was all done by our own hands, and it has answered the purpose perfectly, in every respect. The cost was perhaps from $150 to $200, counting every thing. It will be noticed that the arrangement of the beds is not exactly as I have recommended; but by careful experiment on a smaller house attached to the above, I am satisfied the plan laid down here is the correct one. Our heating is done by steam pipes, a three-inch pipe going clear around the outside of the room, and terminating in a large cistern directly under the large central bed. With the water in the cistern heated up nearly to the boiling-point, the temperature of the room keeps perfectly, even when the temperature is zero outside. The dimensions of the greenhouse pictured above are about 20 x 24 ft.

In the above directions I have considered glass only as a covering for the cold frames, hot-beds, etc. In Peter Henderson's latest catalogue he mentions the use of oiled muslin in place of glass, and states that it is superior to glass in respect to injuring plants by *too much* heat. As the oiled muslin is only partially transparent, of course it won't heat up as glass does. Perhaps we might mention here that the heat of the sun, when confined in a close box, covered with a sheet of glass, will give heat sufficient to melt beeswax, and scorch wood. In an experiment made this 11th day of February, with what bee-keepers call a solar wax-extractor, the thermometer indicated a heat of 180°. Well, the muslin, being somewhat porous, allows a slow circulation of air, besides obstructing a great part of the heat, and yet it is a tolerably good security against frost. We take the following from Henderson's price list, although we have not had an opportunity to verify the statement by our own experience:

> This we have found an excellent substitute for glass, in protecting and forwarding all kinds of seeds and plants for which glass sashes are used in early spring. It is safer, in fact, than glass, as it protects at night, while the temperature is not raised too high by day, as is the case with glass sashes, unless great care is given in ventilating. And being light and portable, it can be sent into sections where it would be difficult to get sashes. Moreover, it costs only one-eighth the price of glazed sash; and as it is waterproof, with care will last for ten years.

The fabric above is nothing more than common cheese-cloth, coated with boiled linseed oil. It is, however, so easily torn or injured that we are going to test by its side some stout cotton cloth, oiled in the same way. A large sheet of this material could be easily handled by two men, and might save many times its cost during a single night, when late frost occurs unexpectedly. For such a purpose it might be supported by some stakes stuck down among the plants, or by some long light strips of pine, with iron stakes attached, so they can be easily and quickly pushed into the ground.

To be continued March 15.



He that is faithful in that which is least, is faithful also in much.—LUKE 16:10.

MYSELF AND MY NEIGHBORS.

White Lumber for Making Sections.

RAISING BASSWOODS, AND SOME OTHER MATTERS PERTAINING THERETO.

Cast thy bread upon the waters: for thou shalt find it after many days.—ECC. 11:1.

THE question is being constantly agitated at our conventions and through our journals, in regard to cutting down our basswood-trees that furnish the honey to make nice white sections to contain said honey, and present it to consumers in a marketable shape. The question has been asked, "What shall we do to stop it?" *My* answer is, "Raise more basswoods to take the place of those being cut off." It looks at present as if there were no other lumber in the world equal to basswood for this purpose; and if such is the case, why not start basswood-forests at once? These trees, while getting to be of a size suitable for honey-boxes, will furnish millions of pounds of honey, so that we have some bearing a crop while others are making their growth for timber; and it is my honest conviction, that they will pay their way right along. We want men and boys with brains enough and energy enough (which is sometimes more needed than brains), to go to work and gather the basswood seeds, or put out the cuttings, whichever may be best, and start the trees growing by the millions. They can get their money back as they go along, by selling the little trees to bee-keepers, and others who want them. If little basswood-trees were now in the market, say two or three inches high, or of such size that they could be sent cheaply by mail, and offered at a price as low as other forest-trees are offered, millions of them could be sold, and at a good profit too. Then we want a little treatise on basswood-growing, by some one who has actually done it. We want to know exactly the conditions they require to make the wonderful growths that we often see them make in their native forests. We want to know just how to make them boom. If it is necessary to bring in father Cole's agriculture, it will pay us to go to the expense of that. And, by the way, I am going to have some little basswood-trees put right over my reservoirs. I want to see the little bundles of fibrous roots just revel amid those piles of stone, covered with water the year round. We want big, strong, thrifty plants to start with —something like the best plants we get of market gardeners. In my own basswood-orchard there are now many trees that bear pretty fair crops of honey, and they would make quite a nice lot of beautiful sections, if they were to be cut down. One big mistake I made was in putting the trees too far apart. The largest trees in the whole plantation are where I set a lot of trees left after we got through, and these large trees are standing now not more than a yard apart. If put in rows twelve feet apart, and six feet apart in the row, they could stand there until the larger ones would make quite a lot of beautiful white sections. It seems pretty hard, I know, to talk about cutting down a strong thrifty tree while in full bearing: but, dear friends, can't we raise enough of

them so they can be spared as well as not? The loss of this source of honey is more to be feared by the bee-keepers of America than the craze about artificial honey-comb, or, in fact, any other craze that may come up. Farmers *will* cut down basswoods, where a good price is offered for the lumber, in spite of any thing we can do.

Now, then, let us gird up our loins and commence raising trees. The little trees we pick out of the forests are not first class. They need planting out in good rich nursery ground for a year or two before they are fit to sell; and my impression is, we could get nicer trees, quicker and cheaper, by raising them from the seed in the first place. Has anybody any basswood seed that will grow or can it be had? Has anybody any little trees raised from the seed, that they will send at reasonable prices? Those pulled up in the woods are almost always twisted and starved-looking. We want some nice ones to start with. Rouse up, ye juveniles, and help your Uncle Amos in his plan of providing basswood honey for future generations. Why, when I think of it I almost feel as if God had a promise laid away somewhere, that we haven't found yet, that those who labor for new generations, to rise up long after them, should somehow be permitted either to be present or look on and see the fruit of their labor. I do not know what will be going on in 1900; but somehow I feel as if God were going to give me a glimpse of it, and allow me to love the bee-friends and their children's children then as I do now.

Now, then, boys, hurrah for the young basswoods! not only during the year 1900, but during this bright new year of 1886. How much can we do toward it? If we can not get seeds, let us get nice little trees from the woods. Give them poultry manure, give them ashes, give them bone dust or phosphate, or whatever they tell us they like, after we have offered it to them. I have seen them take bone dust and ashes already. When you see their beautiful green leaves unfolding and spreading out, of prodigious size, even though they are not yet a foot high, see if you do not say with me they are one of the prettiest plants that God ever put on this green earth; and they are the plants that are going to furnish the beautiful white delicate aromatic comb honey that no man ever counterfeited successfully yet, nor ever will, while this green earth shall last.

Ernest just now reminds me that I ought to have made the above to occupy the space assigned to Myself and My Neighbors, and I think it will have to do, even though it was not intended for it. You who go into this little basswood-tree business are to be my neighbors; and I confess I should like to call the little trees my neighbors as well. How can we have pleasanter "neighbors" than a row of beautiful basswood shade-trees in front of our homes, or, if you choose, clear around our farms, or wherever there is a roadside? Wait until about the fourth of July, when the trees are in full bloom, and roaring with bees, and then tell me if even one such a tree is not a neighbor worth having.

THE BEE'S STORY.

SOMETHING FOR THE "WEE" FOLKS.

LITTLE Millard, who attends the Bloomer school in a western city, was walking slowly home from school one beautiful summer evening. This little boy liked nice flowers, and knowing his mother would tell something about any flower he might bring her, he always watched for a flower. Right by his path lay a beautiful red rose.

"Oh, how pretty!" said Millard; "mamma will like that, I know she will."

When he stooped to pick it up, he heard a buzz; and, looking up, saw a bee very near his head.

"Nasty thing! I'll kill it; it shall not spoil my pretty rose," said he.

He began to throw stones at the innocent bee. Why did the bee not sting Millard? Did it not find the flower first? Of course, its right came first, but it is going to talk to Millard.

"If you will sit down, Millard, and take the rose in your hand, I will alight on it and tell you about my home," said the bee.

"Your home!" said Millard; "you have no home."

"Yes, I have," said the bee.

Timidly our Millard sat down, and the little brown coated worker took his seat on the rose.

"My story," said the bee, "must be short, for the flowers have more honey than we can gather to-day."

"What do you want honey for? Where do you put it?" began Millard, as fast as he could talk.

"Well, I will tell you all about my home. What I want honey for, and where we put it," said the bee. "As you go to school to-morrow," it went on to say, "look in Dr. Lutes' yard. You will see several little houses—boxes you will call them. I wish you could see inside. The one next the corner is my home. Our house is two stories high. In the first story, or down stairs, there are eight long narrow rooms. Here is where the baby-bees stay, each having a little cradle to himself. When a baby-bee is five or six days old, the nurse-bee seals up the top of his cradle. Here he sleeps until he is big enough to come out and work in the house. Our mother stays here too. Her name is Queen Bess. She always has the nicest things we bring home. I always take nice things to her."

"That's like me," said Millard; "I am going to give my mamma this rose."

"You are a good boy, then. You wanted to know about what I did with honey. We have many, many nice boxes, or cells; into these we put the honey. You know we must work hard, for flowers do not bloom all the time. It is almost sundown, so I must hurry. We must kill a lot of lazy drones to-night. They eat much, but are so very lazy they never work at all. It is not worth while for them to live."

"Oh!" said Millard, "I do want to see your home; but the other bees will sting me — I know they will."

"No," said the bee, "not if you do not harm them."

"The drones will," said Millard.

"Oh! my dear boy, a drone can not sting. He makes plenty of noise, but, like bragging people, that is all it amounts to. We are both staying here too long, Millard, I must go. We will talk some oth-

er day." Away flew the bee, leaving Millard all alone with his red rose.

"I am going right home and tell my mamma," Millard said, and away he ran.

Estell, Hayes Co., Neb. LUCILLE L.

SOME INTERESTING OBSERVATIONS.

Actual Experience of a Juvenile.

LOSS OF HONEY BY DISTURBING IRRITABLE COLONIES, ETC.

THE bees are wintering pretty well so far. They had their last flight Jan. 3d. Since then it has been very cloudy and cold. Our bees are mostly hybrids, but there is one swarm composed of pure Italians, and many pure Italian bees are among the hybrid colonies. In 1884 all of our bees were very gentle, seldom stinging any one. This year most of our bees were pretty gentle, but one or two swarms were somewhat cross. In the spring one weak colony was destroyed by robbing, and another was saved only by being removed a couple of miles. This (although hybrid bees) proved to be a very gentle colony. During the autumn and winter, while looking into the hive while feeding it, it received many disturbances, but I could never see that they had any tendency to wastefully consume their stores. To-day, on looking into them, the hive-door came open with a loud snap, but I could not see that the bees were much excited, nor did I see them dive into the cells, as bees that are liable to consume honey, when jarred, get into the habit of doing. The crossest swarm that we have is the only swarm that I ever saw fill themselves with honey when jarred. I find that bees are very easily disturbed in winter. I once disturbed a swarm by simply tramping on the frozen ground near the hive.

QUEEN-CELLS.

Last June a box-hive colony that had filled the hive with bees, brood, and honey, started queen-cells. One of the cells was rapidly built up, and was nearly ready to seal, when, on looking into the hive one evening, I saw that the cell had been well-nigh torn to pieces, and through the openings I saw the queen-larva. The next morning the cell had been mended, but it was only half as large as before. It was then abandoned.

This was several days before the first swarm came out. Now, what caused the bees (for it must have been the bees, and not a young queen) to tear down the cell? Last summer we had an after-swarm come out that returned to the hive. While going back they were very cross. The next day they came out to stay.

In the autumn of 1884 the bees gathered a great deal of honey-dew from the maples; and as a great many of the bees around died during the winter the honey-dew probably had something to do with it. Last fall I did not see a single bee gathering honey-dew.

BEES FLYING HOME BEFORE A RAIN.

I often notice the queer way bees have of hurrying home from an approaching rain. They pour in by thousands, and in a few minutes all from the fields are safely in the hive. While coming in they have an excited, hurried manner, and make a deep scared-like sound. They do this when a cool damp wind is blowing, and the clouds threaten rain. But if a rain slowly and silently approaches, they will work away, even if it is raining.

DRONES OUT OF SEASON.

Last fall, during buckwheat bloom, one of our hives became so crowded with bees and brood that they started a queen-cell, and we were afraid that they would swarm. About a month after the bees had killed their drones, some drones again appeared in three swarms. In one they were immediately killed, and in the second remained but a short time. The third colony that had them was the one just mentioned, that started the queen-cell. In this colony they were soon killed, the drone-brood torn out, the cell deserted, and swarming was abandoned, although buckwheat continued blooming. I at first thought it strange that bees would allow drones to remain after the honey-flow, and in the fall; but they were not queenless, and I could not see that any thing was wrong.

Three or four years ago some men living near us saw bees and comb on the side of a tree. Thinking there might be honey inside, they cut it down; but, lo! there was only a bunch of bees and comb on the side of the tree. A large hollow was below them, filled with ants. Could the bees have chosen the hollow, and the ants caused them to leave it? Or perhaps they settled on the body and went to work as bees sometimes do on fences, etc.

CHARLIE L. GREENFIELD.

Somerville, Butler Co., O., Jan. 27, 1886.

Friend Charlie, I believe you are right in thinking that it makes a difference as to what the temper of the colony is, in regard to the loss of honey from disturbance, and therefore it is, without doubt, more profitable to keep good-tempered bees than vicious stinging hybrids. I have seen queen-cells torn open as if a rival queen had hatched out and afterward patched up by the bees, and a good queen to issue from them. I suppose the reason was, there must have been a difference of opinion as to what course was best in the hive—that is, if bees do have opinions, and it looks as if they do.—It has always been one of the most interesting sights to me to see bees come home at the approach of a thunder-cloud, and you may perhaps remember that I have several times written about it. Their instinct is sometimes, however, considerably at fault. You will notice they may be frightened by a cloud that does not come near us at all; and, again, they may none of them, apparently, notice a coming shower, and in consequence get pretty well drenched before they make the "home stretch."

BRANDING CATTLE IN CALIFORNIA.

A TALK TO THE JUVENILES, BY AUNT KATIE.

DEAR JUVENILES:—Did you ever hear of a "*rodeo*"? That is the Spanish name for a gathering-up of cattle. Once a year, owners of cattle have them all gathered together in large correls, and those which are not branded (marked with their owner's initial or mark), are so branded. You will wonder how they can be told apart, as the cattle are allowed to all run together pretty much. You see, when a calf has been allowed to run with its mamma ever since it was born, of course it will stick close to its mother's side; and as the mother has a brand, of course the calf is branded the same. Once in a while an animal will escape being branded until it is too old to tell whose

it is, and any one then has a right to claim it, and for just that purpose there generally is a lot of sight-seers.

One day, when we had been in California about one year we heard that there would be a *rodeo* here at Los Alamos, and we came down to see it. We came down the Santa Ynez Cañon. The hills around us seemed to be alive with cattle and horsemen. It made me hold my breath to see how those riders would come rushing down the hillsides, often on the full run. Sometimes a horse would stumble into a gopher-hole, and over would go horse and rider, sometimes badly hurt, but more often only scratched by the rough brush. Up they would get and off they would go, may be to perform the same feat several times, before the cattle were all gathered in.

At that time many of the cattle were Mexican stock—long, lean-looking animals with tremendous horns; and if they found a person on foot they would kill him if possible; and even on horseback a person was not always safe. Many a horse has been killed, and the rider saved only by climbing a tree, of which there fortunately was plenty, or by some other strategy.

Well, they got all the cattle they could find on the ranches of the three men who had called the *rodeo*. There was a corrêl on the Laguna ranch, near a large laguna that the stockmen liked, on account of its nearness to water, and the cattle were within that correl. Such bawling and mooing! it was deafening. But the Spaniards there assembled seemed to enjoy it. Two or three had built a large fire, to heat the branding-irons in, and others were riding around, swinging their lassos, ready for the fray. Not liking to stay to see them work, I went on to a friend's house, while my husband stayed to see them, so I will give you his account of the way they did it.

As soon as the irons were hot, two Spaniards went into the correl on horseback, and one caught an animal by the horns with the lasso, while the other lassoed it by the hind feet. It is surprising how quick they can do it; and then each pulling in opposite directions, the animal would fall, and the owner's man would rush up with the hot iron and press it upon the fleshy part of the hip until it smoked. It seems cruel, but it is not worse than many a child gets burned. Then the lasso ropes are loosened, and the animal springs up and disappears in the band. Sometimes, if the victim was a steer, he would charge upon the horsemen. Then how the outsiders would shout and laugh! As it will not do to leave so many cattle together long, they have to work fast, so that changes are made frequently; and if any one is not expert, his time for brave show is short. After all are done, then a fine fat animal is slaughtered, and they gather around the fire with the meat cut into long strips with the grain, and roast it over the glowing coals on long sticks. Then they feast and tell stories, and generally make a night of it, as many have come miles to see the *rodeo*.

The glorious weather and dry ground make camping-out a delight. The next year after that *rodeo* was one of California's dry years, and the most of those cattle either starved to death or were slaughtered for their pelts, and these ranches were rented to American farmers, so that, for this part of California, the *rodeo* is a thing of the past.

Los Alamos, Cal. AUNT KATIE HILTON.

Every boy or girl, under 15 years of age, who writes a letter for this department, CONTAINING SOME VALUABLE FACT, NOT GENERALLY KNOWN, ON BEES OR OTHER MATTERS, will receive one of David Cook's excellent five-cent Sunday-school books. Many of these books contain the same matter that you find in Sunday-school books costing from $1.00 to $1.50. If you have had one or more books, give us the names that we may not send the same twice. We have now in stock six different books, as follows; viz.: Sheer Off, The Giant-Killer, The Roby Family, Rescued from Egypt, and Ten Nights in a Bar-Room. We have also Our Homes, Part I., and Our Homes, Part II. Besides the above books, you may have a photograph of our old house apiary, taken a great many years ago. In it is a picture of myself, Blue Eyes, and Caddy, and a glimpse of Ernest. We have also some pretty little colored pictures of birds, fruits, flowers, etc., suitable for framing. You can have your choice of any one of the above pictures or books for every letter that gives us some valuable piece of information.

"A chiel's amang ye takin' notes;
An' faith, he'll prent it."

LET me introduce you to our good friend Mr. Drone. He has had his picture taken, and, like all big bee-men, he must have it engraved. Don't you think it is a natural likeness of our old lazy friend? He is more clumsy and big-headed than the rest of his family, and, like barking dogs that never bite, he will make more buzzing than half a dozen bees, but never stings. His wings are large, and, for that reason, he can easily be picked off the combs. If you are to learn to cage bees, there is nothing better to practice on. As he can not hurt you, you need not feel at all alarmed; and if, by an awkward movement, you should maim him, it will not be a bee or a queen. After practicing upon him awhile you can then try a bee; when you learn the knack of putting bees into a cage successfully, without being nervous, you can try a queen. I tell you, little folks, it is a real art to pick up hundreds of bees and queens, day after day, and not maim one. If your father is a queen-breeder, see how useful you can make yourself to him. Now a few words about bees that have lost their stings.

Reports are coming in quite briskly from the juveniles, all showing invariably, so far, that bees, after the loss of the sting, die very soon; but, as has been said, all the experiments up to this time point to confinement of the injured bee. Some of the older folks have said that a bee, shut up alone on Good candy, would die any way, whether it had received any bodily injury or not. I suppose they mean that the little bee gets so lonesome and homesick that he would just die of grief. Now, hereafter, when a bee loses its sting, do not cage him alone, but

cage him on Good candy, with other bees that are perfectly sound, so far as you know.

I have another problem, which is this: Cage a single bee, one that has not lost its sting, and see how long it will live. If he dies within 6 or 24 hours, or possibly at two days from time of caging, we shall then conclude that the loss of the sting in the experiments so far given did not necessarily kill the injured bees. If, on the contrary, a single bee will live four or five days, or even a week, caged alone, we shall infer that there has been something faulty in your work. My experiments so far lead me rather to the latter opinion. Those of you who are situated in the Northern States will have to wait till warmer weather; for, if a bee becomes chilled once or twice, he will not live long; but the little friends in the South can report for the next JUVENILE GLEANINGS.

A NEW FLY-TRAP.

I must not forget to mention our new improved fly-trap, and it is not patented either. What do you suppose it is? Why, it is Huber's chicken. There was only one that hatched in January, from the old hen that we promised to tell you about. As there was only one from the whole sitting, we took the old hen away and gave her another lot of eggs. No, sir! the old biddy absolutely refused to sit any more, so we put her back in the poultry-yard. The little chick is alone by himself in the greenhouse. In the daytime you just ought to see how he will hunt and eat those little green flies that are such a nuisance. His eyes have become wonderfully acute, and he will pick out a bug where you would almost say there wasn't any at all. Yes, he will travel up and down those beds, and, if you could see him, you would pronounce him a veritable living fly-trap and "bug-hunter." Huber has just gone down to see him, for the chicken likes company; and if left alone he will chirp as if calling the old hen.

ERNEST.

CAN WE TAKE CARE OF THE BEES WITHOUT PAPA?

Papa had 11 colonies of bees last spring. This fall we had 15 colonies in chaff hives, and mamma has sold two colonies. The snowstorm broke a peach limb and it came down on three hives of bees. My papa died Sept. 3, 1885. He was 37 years old. Do you think mamma, Harry, and I can attend to the bees? Papa took GLEANINGS. We like to read it. LEE HOFFMAN, age 9.

Williamsport, Pa., Dec. 7, 1885.

We are sorry to hear of your misfortune, friend Lee. Yes, I feel pretty sure you can take care of the bees with the help of mamma. Our mammas can do wonderful things when they are obliged to, especially when they have several pairs of eager and willing little hands to help them. ERNEST.

STARTING IN THE BEE-BUSINESS.

I will tell how I became a bee-keeper on my own account. I was riding through the pasture on horseback in September, when I found a swarm of bees on a crabapple-tree. I came home, and, pa not being at home, ma and cousin Willie went with me, and we shook them down into a Langstroth hive successfully, queen and all. When we got home we gave them one frame of brood and two frames of honey, and some empty comb for them to fill with sugar syrup. In a week or two a neighbor told pa she had a swarm of bees in an old house, and that if he would take off the weather-boarding, so she could get the honey, he might have the bees. He did so, and gave them to me. We put them in with those found in the pasture, after smoking them. The queen, ma put in a nucleus box with seventeen bees to experiment with, and she found that

MOTH WILL DESTROY GROWN BEES

as well as larvæ. She put them on top of the bookcase in the sitting-room. The air was warm and moist; and when she examined them in a few weeks, only the queen and five bees were alive. The bodies of the other bees could not be found. She cleaned up the combs, taking out every moth she could find, and tried again to see if the queen would not lay. She left them this time six weeks, then found all dead but some moths, fat and hearty.

We all study GLEANINGS and cousin Willie's A B C book, and like both very much. Our bees are packed in chaff, as you direct. I have one more heavy swarm that was a present to me in the fall. I hope I shall succeed, and be as industrious as the bee. A JUVENILE.

Memphis, Mo., Jan. 14, 1886.

"TEN NIGHTS IN A BAR-ROOM," AND HOW TO DO GOOD.

I think my Ten Nights in a Bar-Room is very nice. I let several read it. Uncle Henry has sold nearly all of his honey. The weather has been so bad that I can not go to school. My uncle who was staying in Kansas has come back. He said he saw a town of prairie-dogs, wild-horse ponies, and antelopes.

VIRGIL PATTERSON, age 9.

Humboldt, Neb., Jan. 24, 1886.

Thank you, friend Virgil, for making so good use of the book we sent you. There is certainly a great need of more good temperance books in our homes, and Ten Nights in a Bar-Room gives a very vivid as well as true picture of the downward career of the drinking man. If your book has become too tattered to lend any more, let us know, and we will with pleasure send you another. Such acts of kindness may save some one from a terrible fate. ERNEST.

WHAT DOES A BEE-STING LOOK LIKE?

My bee stung a piece of cloth, and I put it in a cage. It lived 45 hours and 18 minutes. I kept the sting, and it twitched for 12 minutes after it left the bee. I examined it under the microscope, and it made me think of a teapot with two spouts. From the looks of the bees we think their age has something to do with the time they live after they sting any thing. GERTRUDE A. ORVIS, age 12.

Whitby, Ont., Jan. 11, 1886.

The two projections resembling spouts from a tea-pot were doubtless the lancets of a bee-sting which had been torn asunder. The sting proper is made of three little spears, nicely united together—one large spear and two small ones, or lancets. One sting that I once took from a bee kept wiggling for 20 minutes after. This illustrates the importance of removing the sting as soon as possible, as it will of itself work so deep in the flesh as not to be removed. ERNEST.

ANOTHER BEE THAT LOST ITS STING.

Seeing that you had proposed to the juveniles the plan of removing the sting from a bee, to see how long it would live without a sting, I was pleased with the idea, so I tried it when pa was putting up bees to ship. One alighted on the smoker, and left its sting. I put it in a cage and gave it honey, and it lived only six hours and fifteen minutes.

Concord, Ky. CLYDIE PURCELL, age 13.

TURNING THE ENTRANCES OF HIVES TO THE NORTH TO PREVENT FLYING.

I play the violin. Do you love music? Pa had 17 stands of bees last spring, and lost one of them. He winters them in chaff hives on summer stands. He turns their entrances to the north, so they will not fly out so much when the sun shines, and the wind is chilly. They increased to 35 stands last summer, and made 466 lbs. of comb and 470 of extracted honey. Pa uses metal corners; he thinks they will pay for themselves in a short time. He takes GLEANINGS, and I like to read the juvenile letters. I don't work much at the bees, but pa keeps fancy poultry, and I help to take care of them. WILLMER HORNING.

Malvern, Ill., Jan. 10, 1886.

FLORIDA, AND THE EFFECT OF THE LATE FREEZE THERE.

I am going to tell you about the freeze we had down here. We had a very hard freeze. It killed all the oranges on the coast. There has not been such a freeze for fifty years. It killed the mangroves all down. You can go in the islands and see the big old trees all dead; they were killed by the great frost fifty years ago. I don't think that the bees will do much next summer, for the mangroves will not bloom this winter. The palmetto will be the only thing that they will have to get honey from. I don't think that any bees were killed by the cold. Our bees are all right now. We have no orange-grove, but I suppose we are just as well off, because the cold would have killed it. The oranges are all frozen, and good for nothing.

EVA S. GLAWSON.

Hawk's Park, Fla., Jan. 23, 1886.

DOES A NOISE INDUCE BEES TO CLUSTER?

I am going to tell you about our bees. This was a very poor season for honey, but still pa managed to get 700 lbs. of honey from 40 colonies, which increased to 50 by careful tending to keep down swarming, which our neighbor bee-keepers neglected, and they did not get any honey at all. Pa said he would like to see one of your Johnston pumps, and he would like to buy one if they would suit him. We take GLEANINGS, and all of us read it, and like it very much. I like to read the letters very much, and my sisters too. My little sister Lillie has to watch the bees in swarming time, and when they swarm she rattles a tin pan till pa comes to take them. Is it not funny how bees will settle at the rattling? They seem to like music.

CLARA LURKER.

Cold Spring, Ky., Dec. 21, 1885.

It *is* funny, Clara, especially if it is true, that noise induces bees to cluster. You will notice that the A B C book suggests that the noise drowns the shrill note uttered by the advance guard, therefore they have to stop to get reorganized again.

BEES BUILDING COMB ON A BUSH WHERE THEY HAD CLUSTERED.

There was a bee-tree cut not very far from our house, and the bees settled on a bush and built some comb, and the queen had laid some eggs in it when papa went and got the bees. Papa takes GLEANINGS and I read lots of pieces in it.

Ashland, Mo. ROBERT MARTIN, JR.

What queer freaks bees do have! I suppose the swarm you speak of got demoralized when their nice little home came down with a great crash, and they were ready then to take up with almost any home, even though it be a paltry bush. We have heard of circumstances like this before, but they are not very common. A while ago, you remember, a juvenile told us of a swarm that clustered under an old bench. It stayed there all winter, and didn't die either. We like to have the little folks report any thing of this kind that is a little unusual in regard to bees. Perhaps we shall find that many things are not so uncommon after all.

ERNEST.

RAISING CARP, AND RESULTS.

My pa has a carp-pond. He made it last spring. He sent to Mr. Kaler for a pair of two-year-old carp. He paid $5.00 for them, and $3.50 express, and sent for 100 little ones about 4 inches long, besides. He paid $5.00 for them and $3.65 express. Fifty-seven of them were alive. He drained his pond this fall. The two big ones weighed about 3 lbs. each. The 57 were about 12 inches long. There were 1100 little ones about 4 inches long, and he sold six of them that were 12 inches long for $15.00; sold 43 of the little ones for $7.00, and the rest he put back in the pond. The carp-book said the carp bury themselves in the mud in the winter. That is a mistake. My pa went to the carp-pond to-day and cut a hole in the ice in the middle of the pond, and he took the piece of ice out. It was 7 inches thick, and he saw the carp swim around by the dozens. It was 10 degrees below zero this morning.

EMMA JENSEN, age 11.

Valparaiso, Neb., Dec. 16, 1885.

Why, Emma, your facts are very important, I should say. I guess Mr. Peirce, who wrote the carp-book, will have to tell how it comes that the carp were swimming around when it was 10 degrees below zero. May be the cutting of the ice disturbed them, and will result in their death. I have heard of goldfish being killed by cutting the ice on the pond.

TEARING DOWN CELLS: HOW SOON DO YOUNG QUEENS COMMENCE IT?

Let me ask you a few questions about bees. Do you think that bees will do good where I live? I live where I can see the beach every day. How long is it after the first queen hatches, that she tears down the other cells? SARAH SOPER.

Ferndale, Humbolt Co., Cal.

By referring to the map I see you are situated in the northern part of California. The great honey region, however, is more in the southern part of the State; but I should think your locality would be fully as good as Ohio and other States where good yields are obtained.—A young hatched queen will begin to tear down cells very soon if not immediately after she emerges from her own cell. This would depend some on how vig-

orous she was at the time of hatching. If weakly, she would probably sip at the honey a while and then proceed to annihilate her rival sisters. As far as my observation goes, queens do not tear down the cells themselves, but simply make a small hole through the side of the cell, and leave the bees to complete the job, as they are quick to see whether a cell has thus been punctured. ERNEST.

HOW THE YOUNG FOLKS MANAGE THEIR FATHER'S BEES.

I have a sister and brother who are bee-keepers. Willie stays at home, and Annie attends the yard at Rudleton. There are 97 swarms at Rudleton, and about 78 at home. Annie has kept the yard at Rudleton for three years, and Willie the one at home for four.

I am very much afraid of the bees. Last summer Annie had to stop work, for the bees sometimes were that cross.

HOW TO HIVE A SWARM OF BEES.

A good way to hive bees is: Take a salt-sack and sew the mouth of it to an old barrel-hoop, and have a long pole to it. If the bees are up high you can easily get them down. We spread a white cotton sheet on a table, and set the hive on it, and upset the bag on it, and the bees will crawl right into the hive. You must move the hive on to the stand you want them to occupy, or else you will have them go right to the place where they alighted on the tree after they swarmed. MARTHA MOFFATT.

Maxwell, Ont., Jan. 15, 1886.

Let me see; your father wrote an article for the last GLEANINGS. Has he discovered the art of "making himself useless," and so pressed the younger ones into service? I judge so, if Willie and Annie manage 175 swarms.—The swarming device you mention is illustrated and described in the A B C book, page 253. ERNEST.

CLEANING WAX FROM UTENSILS.

Some time ago I saw a letter from some one, and in it telling how to clean waxed dishes; and I thought by your answer you did not know of any better way, so I concluded to write and tell you how we clean ours. Heat the dish on the stove; and while hot, rub well with any kind of soft grease; then wash with hot soft water and soap, and it will come clean easily, and without any trouble.

AN INTELLIGENT DOG.

I have a sister, Nellie, fourteen years old, and a brother, Lloyd, seven years old. Lloyd has a dog that he thinks a good deal of. When you put your hand on a chair, and "shake hands," he will jump up on the chair and hold out his paw to shake hands. His name is Dash, and he is seven or eight months old. There is a big patch of ice a little way from our house, and sometimes we take the sled over there and Dash will draw us on it, back and forth on the ice; and when we are riding down hill he will, of his own accord, take the end of the rope in his mouth and draw the sled to the top of the hill.

HOW AN ABSCONDING SWARM WAS ARRESTED.

Last summer Lloyd and I saved a swarm of bees for papa. He came from the field where he had been at work, and saw a swarm of bees going off. He grabbed a pail of water and went after them. We watched him until he went down in a valley out of sight, and then Lloyd and I took a pail with some water in it and went after him in hopes of catching up with him and stopping the bees. We ran up hill and down till we had gone about half a mile, and then we saw papa coming to meet us, after the water; but there was not much left, for we had run so fast, and over such rough ground, that we had slopped it all over, but it saved the bees. Papa went to the house and got an old nail-keg, and put them in it and brought them home and hived them.

FRANCES E. WORTH, age 12.

Reading Centre, Schuyler Co., N. Y.

The plan you mention, of cleaning wax, if I mistake not, is a combination of the method given by C. C. Miller, page 704 (to which you refer), and the one given in the A B C book, page 287. Benzine is also there recommended as being effective in removing wax where the utensils are inconvenient to cleanse otherwise. No doubt any one of the plans enumerated answer as well.—Well, I am sure you deserved that swarm of bees, after such a "slopping" over. Did the bees cluster immediately, or soon after the water was thrown upon them? ERNEST.

CHARLIE'S HIVING-BOX.

My papa has taken GLEANINGS ever since I can remember. He has got 75 colonies of bees now. In the summer I help him hive the swarms. Papa has hiving-boxes. They are something like a little hive with an alighting-board and an entrance. They are fastened to the end of a pole. When the bees commence to alight we set the hiving-box up under the bunch of bees. They go into the box. Then we take them down and hive them when we get time. One thing I learned last summer. If you take bees from the entrance of one hive and throw them down on the entrance of another hive, you are pretty sure to get stung. I tried it, and got three stings. CHARLIE H. MASON, age 9.

Mechanic Falls, Maine, Jan. 5, 1886.

Thank you, friend Charlie, for your very plain description of the hiving-box. This, constructed with an alighting-board, would doubtless work very nicely; but I should be afraid that a large swarm of seven or eight frames would be in danger of smothering in a small hive. For that reason the hiving-box figured in the A B C book is perforated by a good many holes. Come to think of it, in our practice in our own apiary we hive swarms very much as you do, only we use a full-sized Simplicity hive. As there are no large trees in our apiary, when a swarm issues it generally clusters on one of the low evergreens on the outskirts of the apiary. We then take a Simplicity hive with some empty combs and a frame of unsealed larvæ and place it so the entrance is directly under the cluster. The hive is held at the right height by one or more Simplicity bodies placed beneath. The bees are soon inside, and the hive is located upon its proper stand. This is the way we generally hive our swarms. So much for no tall trees in the apiary. ERNEST.

BEES THAT WOULD NOT UNITE; HOW THE ENGRAVINGS FOR GLEANINGS ARE MADE.

I am living at grandpa's, and going to school. Grandpa had 20 live stocks of bees on Jan. 1, for they had a big fly; but he thinks it will be the last one for many of them, the way the winter keeps. Part of the bees are packed in leaves, and fed sugar syrup, and part are in box hives, left on their summer stands, to take their chances of living or dying.

Two seasons in succession have been too poor for honey here. Grandpa tried to double up some by setting one hive on top of another, but they would not go down nor up; so after two weeks he set them off where they belonged, then they were glad, and came out as usual.

I like to read the young folks' letters in GLEANINGS, so I thought I would tell you about our bees, and may be it would not be thrown into the waste-basket. Grandpa wants me to ask you to explain, if you will, just how engraving-plates are made, so you can make a picture of any thing you want; but if there is any secret about the art, let it go. Grandpa doesn't use tobacco any more since he got the smoker you sent him.

MAUDIE MAY MINN, age 10.

Pine Grove, Gallia Co., Ohio.

You ask how our engravings are made. We first take a piece of boxwood or maple, the depth of the type (nearly an inch), and the size of the picture desired. Upon this the engraver draws with a pencil the object he wishes to represent, and then retouches with India ink. The face of the boxwood is very hard and smooth; and when the picture is done, it looks like any pencil-drawing. Next the engraver uses several sharp keen-edged tools with which he carves the block, leaving only the black lines of the pencil. The shading is represented by parallel lines —the darker the shading, the heavier and more compact the lines. When this is done we have a raised picture which prints the lines and delicate shadings just like the types you see in a printing-office. If you notice closely any of the engravings that appear in GLEANINGS you will see what I have explained. Nice engraving is one of the fine arts, and good engravers get high wages—five, ten, or even more dollars per day.—In regard to doubling up, you do not say anywhere that one of the queens was taken away before uniting. From this, and your description of the colonies, we infer that both had a queen after they were doubled up. This might account for their not uniting; though, as is sometimes the case, two colonies are united regardless of queens, when one will be killed by the bees. I should judge that both your grandfather's colonies remained entirely by themselves, not interfering with each other's queen. ERNEST.

Dear Maudie, do you want to know what part of your letter rejoiced my heart more than any thing else? It is, that your grandpa does not use any more tobacco, and that it is his little grandchild who is telling it to the readers of GLEANINGS, and rejoices in her little heart that he is purer in mind, purer in body, and, I am sure, purer in heart, for the sacrifice he has made for his little grandchild's sake, for our sakes, and for the dear Savior's sake. May God bless him, and help him; and may he be cheered by reading in that good old Bible, "Blessed are the pure in heart, for they shall see God."

A DONKEY GETS INTO TROUBLE WITH THE BEES, WHEREUPON HE "BRADE;" PEKIN DUCKS, AND THEIR VALUE IN AN APIARY.

As there is something so original in Joseph's letter we insert it just about as he wrote it, spelling and all.

My "intelligence" is so little, i do not no of any thing to write that will interest, but you must excuse this one, as it is the first. I like to help pa work with the bees except such a one as that cross hybrid stock that stung Pa so much threw his Briches and run him off to the spring and me under the flore. They drove the young mule colt that was 30 feet away, and made him kick and snort; his hare was long, and they tangled in it, but he soon flew a way and "brade" as he run. Pa says the holy land Bees Will suck 3 flours while the italians will suck 2; he says they do not fool time away in Buzing a Round as the italians do. We keep sawdust 3 or 4 in. deep in our apiary; the ants and frogs will not work in it, the frogs have no place to hide as the dust keeps the weeds down; a frog will eat 50 bees, if he can get them. so much for sawdust. The Pecan Ducks has a good chance to ketch the moth miller between sundown and dark. The ducks go among the hives every evening and ketch every miller that flies; no grass in thear way, so they always lit on Pekins, every one that fly. These ducks is worth keeping for this alone; be sids each duck will lay 200 large egs every year, then they weigh 15 lbs. to pare of 2. The feathers is beautiful and white, and the meat is as nice as chicken. So come and see us and wee will have a big fat one for dinner. JOSEPH S. G.

So it is a donkey this time, and not a horse that meets with a mishap among the bees. No wonder the poor fellow "brade" when a lot of hybrids got after him. I think we shall have to conclude that it is *never* safe to have our domestic animals anywhere near the bees.—I have sometimes thought that the Holy Lands seemed more industrious than the Italians; but for some reason they never seem to have very much honey in the hive. Perhaps it is their disposition to breed so heavily that keeps their supply of honey low.—An apiary with sawdust three or four inches deep makes a very pretty appearance; but in time, according to our experience, the weeds will come. As to toads, I suppose the sawdust answers very well. You say a toad will eat 50 bees. Did you ever count the number? Last month a little girl told us of a toad eating, by actual count, 150 flies, so I presume it would be no very great task for Mr. Toad to eat 50 bees. That being the case, they are not very profitable in the apiary.—We are glad to know that Pekin ducks are valuable in the apiary, for getting rid of moths. We have a pair of them in our poultry-yard, and I don't doubt but that they would render very good service, providing it were something to eat, for they are big eaters.—You have given us so many good points that I think you are entitled to a chromo. ERNEST.

Friend Joseph, I want to add a word to what Ernest has said in regard to your little letter. It is full of original thoughts, and shows a progressive spirit for one so young —at least, we suppose you are quite a small boy, although you do not give us your age; and in regard to the spelling, you have probably done tiptop for so small a boy. We give your letter just as it was written, so the juveniles can exercise their talents in the line of proof-reading by correcting all the mistakes made. Now, then, who will count up and see how many errors there are in Joseph's letter of 27 lines?

OUR HOMES.

Supper being ended, the devil . . . . put it into the heart of Judas Iscariot, Simon's son, to betray him.—JOHN 13:2.

WHO is there who has not pondered over this strange and apparently incomprehensible matter of sin in the human heart? We might almost think that poor Judas was not very much to blame here. Sometimes we are almost inclined to think it was the devil's fault entirely. Had he left poor Judas alone, Judas might have been as good as any of the rest of the disciples. These questions are undoubtedly beyond our province; but even if they are, does it follow that the other disciples were left alone? Didn't Satan try them, each and all? What is sin, any way, and what is the use of it? I speak reverently, without any disposition to question the wisdom of the Almighty. In fact, I wish in this paper to help you all, dear friends, toward a better comprehension of God's wisdom, goodness, and love to us, his poor fallen creatures.

A temperance lecturer gave me a vivid idea of sin, a few evenings since, when, perhaps, he did not intend to. He was likening intemperance to the cholera, and he spoke of the time when the cholera threatened to invade the shores of America. He told how we all went to work, not only in the large cities, but in the towns and villages, to prepare to meet the dreaded foe. We established boards of health, who went around and examined the cellars and outbuildings, and they were clothed with authority to demand and insist that the people should be clean, and take care of themselves. Our cities were purified and slicked up; our most intelligent physicians and scientists pointed out the probable cause of such epidemics, and from one end of the land to the other a general reform was inaugurated. Did we meet and conquer the foe? Yea, more. The result was as any sane man or woman might have guessed. Not only did we keep away the cholera, but the death-rate was rendered less, to the number of inhabitants, than it had ever been before. We demonstrated, by figures, that not only cholera, but typhoid fever, yellow fever, and no one knows how many other ailments, were capable of being controlled. We began to see that disease could be led captive, the same way in which father Cole has "the waters led captive." The point the lecturer made was this: Who did this, and who should have the credit of it? Was it the Republicans? Surely not. No such thought was ever uttered, that to the Republicans belonged the credit of the sanitary measures put in force in our cities. Well, was it the Democrats? Why, no. Was it the Prohibitionists, or were the Prohibitionists more active than any of the other parties in this matter? True, they might have been, and may be they were; in fact, I think they *ought to have been*, according to their profession; but nobody ever mentioned it, if such was the case. Neither was it any religious sect, nor was it the women who led the movement principally. Of course, they did their part, and may be in one sense they took the lead, because women are naturally more in favor of order, cleanliness, and purity, than the men are; but they never claimed any more credit, and no one ever claimed it for them. To whom, then, does the credit belong? Why, to all of us. The people united, no matter what were their politics, religion, age, or sex; and when you get our American people united on any thing, we are *bound* to succeed. Did you know it, my friend? Well, why can't we be united in other good works? Why not be united in resisting Satan, the prince of all evil, and the prince of the powers of darkness. Why, the great truth lies here: The cholera was a common foe; the cholera hadn't a friend any where. Even the man or woman who had determined on suicide didn't want the cholera. He was recognized as a universal enemy and fiend, and we massed our powers against him. Now, then, why not do the same way with intemperance? or, if you choose, why not do the same with sin and Satan in *every* form? Because men *love* evil in its varied forms. Jesus told us, centuries ago, that "men loved darkness rather than light, *because* their deeds were evil." But, why do men love evil? To get a better view of it, why do *we* love evil? Why shouldn't evil be like the cholera—a hideous and hated foe to every one? Perhaps, had Adam not fallen, such might have been the case; but so long as the fact remains that it is *not* the case, and that we, for the time being, love sin and Satan, will it not be wisest for us to meet it as it is? We are in a fallen world: what shall we do?

I have talked to you at different times, of late, in regard to making the elements, that do us harm, our servants. The sudden and terrible frosts of winter get into our cellars, and freeze our vegetables, and away go hundreds of dollars in a single night, because we didn't expect such a freeze. During this present winter, we are told that the friends in Florida have suffered the loss of over a million of dollars by the freezing of their oranges, and that such a frost has not been known before for over fifty years. Shall we sit down helpless before old Boreas, and call it a "dispensation from God," and say there is no help? God forbid! By the help of science, we shall get more and more able to manage these erratic forces of nature. Let us employ these freezes in converting water into big blocks of ice; and let us carry the big blocks of ice into these same cellars, and make them arrest rot and decay in these same fruits and vegetables that the frost was before liable to destroy. By recent inventions in cold-storage rooms, apples can be kept safely from one year to another. Strawberries can be bought up, when five cents a quart, and kept until the glut in the market has passed by, and then sold at good paying prices. We do this by simply knowing how. The frost becomes our *humble* and *obedient servant*, and does our bidding so faithfully that a good cold-storage room need not vary more than two or three degrees in a year. Careful experiments have

shown us just what temperature apples and strawberries, and other commodities, should be kept in to preserve them from either becoming spoiled by too much heat, or from freezing; and with a properly arranged cold-storage room, the matter is a complete success. Now for the application.

A good many of us have hasty tempers. I do not know that *hasty* is the right word. Some of us have tempers that are slow, and yet unmanageable even then. Perhaps they are the curse of our lives: what shall we do with them? I will tell you, friends. By the help of God we can handle them as we do the frosts of winter. When the temper comes up, and you recognize it boiling and seething to get out, set it to work making great blocks of ice, as it were. Put these blocks away until you need them. They will prove to be a tremendous motive power, if properly managed. Don't kill out a boy's spunk; find some place where he can use it and utilize it, and he will be as great a power for good as he has been for evil. The temper needs to be a *sanctified* temper, and I believe that such a thing is possible. Let me tell you a little of myself.

Sometimes, on going my rounds after the work is over for the day, I find property scattered about in heedless disorder. The vegetables and fruits that should be in the cold cellar are left, may be, near the steam-pipes, while something that should be kept warm is possibly put where it will freeze. May be I have talked with the one who left them so repeatedly, and it does not do any good. His mind is on something else. Perhaps he cares more for the small wages he receives, than for the welfare of property worth ten times these wages. My temper comes up. I try to put the subject out of my mind, but it won't come away. Perhaps it is Saturday night, and I begin thinking, "There, my enjoyment of the Sabbath is all gone, for I feel so worked up by this matter." May be, instead of the loss of property, some new convert in whom I had much faith has been going off with a crowd of boys, to go in swimming on Sunday; or perhaps some one who has given me the most faithful promise in regard to tobacco has been smoking on the streets. Satan tries to enter my heart, or tries to tempt me, and suggests, "I wouldn't fuss or bother any more with that miserable specimen of humanity. I would send him somewhere else for a job, so quick he wouldn't know what is the matter with him, and I wouldn't wear out my life and strength in chasing around after any more people, so utterly unprincipled and irresponsible." Dear friend, do you suppose I feel happy when I arrive at such conclusions? Why, bless your heart, no. If I allow my mind to dwell on it, the more the feeling of indignation wells up, and I begin recounting all the kind acts I have done, and thinking, "And that is just the pay I get for it—that is my reward." Then I remember some one else who has made a bad mess of something or other, and I feel like saying, "I am going to give the whole thing up, and not try any more." I remember the boys in jail. It is too bad to chop right off, and not visit them any more. But Satan suggests, "You might just as well. This has so upset you, that you haven't any spirituality left any way;" and for the time being I actually think and believe that all the enjoyment of the coming Sabbath is surely at an end. However, I conclude to go through with the duties that lie before me, the best I know how, keeping it all to myself, and bearing it as best I can. About this time it occurs to me that I have proven, by hundreds and hundreds of similar experiences, that the only outlet is to go down on my knees and tell my troubles to the Friend of sinners. Is it right to get down on your knees when you are mad? Why, to be sure it is—that is, providing your "mad" is not the kind that prompts you to turn from the Savior. If you are vexed and disturbed, but still *loyal* to him, *by all means* go down on your knees. Just let loose your feelings, or, in other words, take one of those big blocks of subdued temper and tumble it at the Savior's feet. Tell him your troubles and trials; ask him to help you to honor him in whatever you do; and if, when you get up, you haven't got clear out of the toils of the tempter, don't worry nor trouble yourself very much. Pitch into business; straighten up the things that are wrong, *yourself*. Make up your mind to bear the burdens of the world, even as the Savior bore them; decide to be patient and long-suffering for his sake, if not for their sakes. in other words, take your cross and follow the Master.

Then said Jesus unto his disciples, If any man will come after me, let him deny himself, and take up his cross and follow me.

Whenever the subject comes up again to annoy you, put it persistently out of your mind. If it should occur to you during the sermon on the Sabbath, just say over to yourself, "Remember the Sabbath day to keep it holy," and stop thinking about it, and, first you know, the matter will dwindle into insignificance, and you will be surprised to find yourself happy and peaceful. I remember how, years ago, when I had started to go to my mission Sabbath-school, full of the spirit of the Master, and thoroughly happy, on my way I passed through a field of my buckwheat, just beginning to ripen into seeds. I picked off a few, and was startled to notice that it looked like common buckwheat instead of silverhull, which we meant to have sown. All at once my mind suddenly reverted to the time when one of the hands moved some bags of buckwheat, and in a minute it was clear to me (or at least I thought it was) that that heedless hand had been the cause of making that a beautiful field of common old-fashioned buckwheat, instead of silverhull. My face grew hot with impatience. I fought and struggled against the tempter; but the vexation was so great, that every spark of God's Spirit seemed to be quenched out of me, like the blowing-out of a lamp. I dare not put on paper the bitter feelings I had toward that careless hand. Why, my friends, if your temper is like mine under such provocations, may God in his mercy have pity on you. My mother used to tell me, when I was a child (as I have mentioned before, perhaps), that I would surely die on the gallows, if I gave way to such

spells. Some of you may say, "Why, Mr. Root, I thought you professed to be a Christian. Here you are making a confession of getting mad, even so your face was flushed, and that, too, on the Sabbath day, when you are on your way to a mission Sabbath-school to teach a lot of children, and a little community, the way of eternal life. Shame on you, for a hypocrite!" Hold on, hold on, my friend. I was terribly vexed and stirred up, and my heart seemed to beat like a small locomotive; and right here I want to thank God for having put a small locomotive in even this feeble frame. It was bad, I know. My temper should have been more perfectly sanctified; but, dear friends, the but recently converted boy was doing the best he could. I was alone in the fields. I was under God's blue sky, and under his overshadowing love as well, I am sure. I prayed him to take the tempter away. I have sometimes wondered why he didn't do it. I prayed for perhaps nearly half the way of that five-mile walk to my school; but it was some time before the fierce passion began to "let up." How about the school? Why, God took care of the school, and he took care of me, and it went off all right, and I came home breathing praises, and singing, "Thy will be done," or something to that effect.

On Monday morning I examined into the seeds carefully, and found there was no mistake in the sowing. I also discovered that silverhull buckwheat looks very dark, or almost black, when it first ripens in the field, but that the silvery look comes on afterward.

Do you want to know what good came of this little experience? Why, it resulted in making a good lot of great blocks of—what shall I call it?—subdued and sanctified energy—a kind of energy and push, freezing up, as it were, like the blocks of ice, to be kept until it could do some work. The work done was a vehement determination to have our seeds so perfectly labeled, inside the bags and outside the bags, that no such accident could happen as happened that year; that is, such an accident as happened only in my imagination and uncharitableness. This very event, perhaps, did more toward building up an immense trade in seeds, than almost any thing else could have done. A sanctified temper that was piled up that day, is, some of it, there yet; and when I find a lot of seeds not plainly labeled in at least *two* different places, the energy stored up begins to make itself shown. Is it not well, for me at least, that God has permitted me to be tried, and severely tried? Do you remember the lines of the little hymn I have several times told you about?—

> Joy to find, in every station,
> Something still to do or *bear*.

In my case, my temper came up that day a good deal because my whole heart and soul were so taken up with raising honey-plants, and testing them, that I should have been terribly disappointed if the right kind of seed had not been sown. My feeling was in some respects commendable, but I was wrong in being impatient or hasty. A great many other times in my life, when I have been sorely tried by disappointments because of some such accident, instead of venting my spite by harsh and unkind words, I have gone off by myself and poured out my soul in prayer, asking God to use this intense determination to have a better state of affairs; and when I started back to my work I have felt like saying to myself something like this: "Now, *you see* if I don't have this thing fixed in some way so that this blunder *can't* happen again," and the energy and determination was the very thing which pushed me toward some important invention—not only helping myself, but you also, through the medium of these pages of GLEANINGS.

But, how shall we make an appetite for strong drink or tobacco, or something of that kind, work out good? How shall we freeze *this* sin into blocks of ice, to be saved up? Perhaps we can manage as father Cole has managed with the rains and floods—drop them down out of the way, where they will be harmless, but where they may at some time do us good service, after the harm is past. Satan sometimes gets hold of us because we are uneasy and discontented. We want something, or want to go somewhere. Because we feel uneasy we let our minds wander toward the forbidden thing. We want some excitement, or something to do. Life as it is, is too monotonous. I have been through all these experiences, and I will tell you what I did. I prayed God to help me to put his image in the place of the thing that would do me harm. I prayed him to help me to substitute, in place of the thing that would harm me, and harm my fellow-men, a love for my Savior that would surely do *good* to my fellow-men, and the prayer has been over and over again answered. I have lately been thanking God for giving me such a keen zest and enjoyment in raising plants and vegetables, and I have thanked him for the consciousness that this is an innocent and harmless amusement, if nothing more, and I have certainly never enjoyed any thing else so much in my life—no, not in the whole forty-six years of my life, even including happy childhood. We want to let these lower appetites and passions down on a lower level, where they belong, where they will be servants and not masters, just as friend Cole lets down the water from the rains. God's Spirit is to rule, and these other things are to be secondary.

A great temperance movement has taken place in our town, and this morning almost all the hard drinkers here are wearing the blue ribbon. Last evening we were disappointed in getting a speaker from abroad, and so the responsibility fell on our home talent. A hard-working man, whom I have known for fifteen or twenty years, and one whom I have seen go down into intemperance, and come up through a Murphy pledge more than ten years ago, after much urging took the floor. He told us about the conflict of ten years with this fierce appetite. Three points come right in with this Home Paper, and I want to mention them. Satan tried to enter his heart again, as he did with Judas, and this is the way our friend resisted. He said there were times, especially

toward the close of the day, when it seemed as if he could not live without a drink; but he went resolutely home, kept away from evil associates and temptations, and went to bed without the drink. In the morning it was all over. The fierce gnawings of appetite were gone, and gone a thousand times better than had he given way to it. He said this not only happened for months, but for years. Finally he was taken sick, and came near death. The doctors gave whisky, as usual. When he began to come to himself a little, he tasted the whisky in his medicine, and remonstrated with his attendant, a near neighbor. The neighbor told him he must take it, or else death would probably result. Well, our friend John is an Englishman, and he has his full share of English spunk and stubbornness; in other words, he has a good "big chunk" of a temper, like myself. He replied, that he was not going to take whisky for *anybody*. They sent for the doctor.

I can not give his exact words, but the substance of them is about like this.

"Mr. E., this is serious business."

"Well, doctor, that is exactly what I think."

"If you take the stimulant we think best for you, you will probably get well; unless you do take it, we don't see any help for you."

Still our English friend was immovable, and the doctor resumed:

"Mr. E., which would you rather do—take whisky, and get well, or go without it, and die?"

The old hero looked the doctor full in the face, and quietly replied, "*I would rather die.*"

At this point in his speech the audience encored until it seemed as if the building would come to pieces. Now, boys, *that* is *the doctrine*. When Satan tries to enter your heart, tell him squarely and decidedly, "*I would rather die.*" Was this foolhardy? Not a bit of it. Which is better—to live, with a great prospect of dying eventually the death of a drunkard, or dying an honest death, free from the influence of stimulants? "What shall it profit a man, etc.?" What are a few years of life worth, providing the life is a life of sin? When Mr. E. first signed the pledge, it was at a Murphy meeting. He had always been much in the habit of staying at home on Sundays; but this Sunday evening, as he was out later than usual, his wife looked up inquiringly.

"Where have you been, John?"

"I have been at the temperance meeting."

She looked up, somewhat astonished.

"What did you do there?"

He put his hand in his pocket, and took out a Murphy card, and showed it to her. Poor woman! She, like the rest of us, lacked faith, and inquired if he thought he could keep it.

"Jane," said he, "did you ever know me to sign my name to a paper when my signature didn't mean something?"

"No, John, I never saw your name signed to a paper unless it meant all that was written above it."

She took the little card and framed it with a fancy frame of straw, worked out by her own hands, for she is an English woman, and understands fancy straw-work, and hung it up on the wall, and whenever John looked up at the clock to see the time of day, there stood his Murphy pledge, right above his own handwriting. It was an *object-lesson*, and a reminder. And so John pulled through the years as they passed by. He has now a nice little home; bright and educated children, and he is a man whom the town of Medina delights to honor.

Dear reader, do you see that even an Englishman's stubbornness can be made to serve God? And do you see now that what is needed to bring about this glad millennium in our United States of America is, that these tempers and this stubbornness shall be sanctified and consecrated, and laid at the feet of Christ, telling him, "Here, Lord, I bring myself and all that I have—my appetites, my passions, my fierce temper, and lay them all at thy feet; and I ask thee to help me to say in real earnest, 'Get thee behind me, Satan.' And when the devil shall try to put it into my heart to do evil, and forget thee, may I, too, have grace and strength to say, 'I would rather die.'"

I need not add, that our friend did not die, in spite of what the doctor said; neither will *you* die either, my friend, although you may think you are going to die; for has not the Savior said,

Whosoever liveth and believeth in me shall never die?

GLEANINGS IN BEE CULTURE.

Published Semi-Monthly.

A. I. ROOT,
EDITOR AND PUBLISHER,
MEDINA, O.

TERMS: $1.00 PER YEAR, POSTPAID.

For Clubbing Rates, See First Page of Reading Matter.

MEDINA, FEB. 15, 1886.

Thou art weighed in the balances, and art found wanting.—DAN. 5:27.

PRICE OF 24-LB. SCALE REDUCED.

WE are pleased to tell you that we are able to sell these at $3.50 each, or $6.50 for two, and the double beam one-third more. These are the same scales that we have sold for years; and as the manufacturers gave us a better rate this year, we take pleasure in giving our customers the benefit of the reduction.

A CORRECTION.

IN noticing circulars received, in our issue for Jan. 1, we gave the address of J. D. Rusk, Milwaukee, *Oregon*, as Milwaukee, *Wisconsin*, which last is wrong. While we are about it, we must say we think it somewhat unfortunate to name new and small towns New York, Chicago, Philadelphia, etc., when plenty of other good names can be found; and this hint is in accordance with the suggestions of the U. S. Postoffice Department.

PERHAPS I should tell the juveniles, that in the picture on page 142, of our greenhouse, the figures in the foreground are supposed to be myself and Huber. The picture of myself is pretty fair, only the engraver doubtless supposed that the sun was shining from the west, and so he pushed my cap down over my eyes, as you see. He has got Huber pretty fairly, only he ought to have pictured him about half as tall as his papa.

ANOTHER USE FOR THE TRANSPLANTING-FRAME.

THE transplanting-frame, shown on page 136, is also an excellent arrangement for sowing seeds of certain kinds. We have some beautiful beds of onions, made by putting the onion-sets, one in the center of a row of meshes, then skipping a row, etc. Beets, also, may be quickly and accurately sown in the same way. By means of this frame, any child can put in seeds, and get the spacing exactly right. All you have to do is to pick up the frame, and put it down again until the seeds are in.

160,000 SECTIONS AT $2.25 PER 1000.

WE guarantee our first-quality sections to be equal to or better than any in the market; and in order to make them so, we have culled out all that are colored, or in any way not up to the standard. Now, these second-quality sections are like "thirds" in crockery—they are just as good for service, but do not look quite as well as firsts. We have now in stock 160,000 of these sections; and as long as we have any on hand we will sell them at half price of the first quality; i. e., $2.25 per 1000; or, for 5000 or over, $2.00 per 1000.

SEEDS OF BASSWOOD-TREES.

SINCE writing on page 143, in regard to this matter, we have received the following from friend Kendel, of the Cleveland seedstore:

> The seed of basswood and linden can undoubtedly be obtained now; but, how about its germinating? We can not tell. The last, and, in fact, all the tests we have made in hot-beds have utterly failed. A. C. KENDEL.
> Cleveland, O., Feb. 9, 1886.

In view of the above, probably we shall have to give up the seeds; but I discover that E. H. Ricker & Co., of Elgin, Ill., advertise European linden seedlings at $8.00 per 1000. Now, who is there who can furnish us seedlings of the American linden, at as low a price, or still lower? And who can tell us about the quantity of honey European linden furnishes, compared with our American? I know this ground has been gone over before, but I don't think it will hurt us to consider it again.

REDUCTION IN PRICE OF WIDE FRAMES.

By the new method of filing saws, we do away with the planer on sections, frames, etc., and turn out nicer work, smoother and better finished, than ever before. Besides making them nicer, we can also sell them cheaper. Wide frames in the flat, Simp. size, to hold 8 sections, or the same crosswise Simp. to hold six sections, or, either one one-half depth to hold 4 and 3 sections, also 3 section-cases—any of these we can furnish at $2.00 per 100 or $18.00 per 1000. For odd sizes we always charge $1.00 for setting machines, then you may have any quantity at regular prices.

ANOTHER IDEA IN REGARD TO REVERSIBLE HIVES.

SINCE brood combs of half depth are brought up again, some friend, whose name I have forgotten, suggests that there is not much need of reversing frames when we can reverse the position of these shallow frames so easily. For instance, we have made L. brood-frames of half depth, with half-depth Simplicity bodies to match, for years. In fact, there have been so many calls for them that we have them in stock in case of possible orders. Well, when the bees get the brood pretty well in the lower set, and capped honey, a good deal of it, in the upper set, instead of reversing any of the frames, simply put the upper set on the bottom-board, and the lower set over them. This brings the sealed honey right in the center of the brood-nest, and the bees would probably take it up and put it in the sections, as well as if the frames were reversed, or nearly as well. Have any of the friends been in the habit of working half-depth frames in this way? Half-depth wide frames have also been made for these half-depth Simplicities; in fact, they are in our price list, and have been for years.

BEANS, FOR MAKING HENS LAY.

IN our issue for January 15 I mentioned that we got only one egg a day from about a dozen hens. Well, some time ago we bought quite a lot of white-marrow beans from a farmer—so many that we hand-picked out about a bushel of beans, off in color, etc. The women were going to throw these beans away, but I suggested that they be cooked, and given to the chickens. We tried them first with about a pailful. Well, our flock of hens, with a little assistance from the rabbits and ducks, ate most of the pailful at a meal. What do you think the result was? One egg the next morning before breakfast time (*my* breakfast time, not the hens'), and two more during the day; and although the weather has been down close to zero, we get four or five eggs a day ever since the diet of cooked beans was adopted. Some of the same food was given to the flock at the warehouse, and they commenced laying too, although the weather was so cold their eggs froze before we found them. Now, was this simply the result of a change of diet, or are unsalable beans cheaper and better than the much-lauded egg-foods? Before the beans were fed, the fowls had wheat, oats, and bone meal, as well as soft cabbage-heads, all they would eat. I leave the question with the editors of our poultry-journals to answer. The following is clipped from the *Practical Farmer:*

> There are countries where the almost exclusive diet of the masses is beans. These contain 87 per cent of nutriment.

Now, beans fit for poultry can probably be bought for a dollar a bushel or less. Refuse beans, thrown out by hand-picking, should be procurable at a very low price. For some time I purchased wheat-screenings at a cost of 40 cts. a bushel; but when I discovered that I could get good sound wheat for from 85 to 90 cts., I decided that the wheat was cheaper, and I think so yet. Now, is not a bushel of beans worth as much, or more, than a bushel of wheat, besides the tendency they seem to have to produce egg-laying?

ALLEY'S
DRONE & QUEEN TRAP.
Send 65c. and get sample by return mail.
HENRY ALLEY, Wenham, Mass.

For Sale. I have a Root $25.00 fdn. mill, bought about three years since, almost as good as new, with dipping-tank and all complete. They cost me, when new, $27.50, and $7.00 duty. I wish to sell them, and will take $18.00 for them.
A. W. WILLOWS,
4tfdb Carlingford, Ontario, Canada.

Bee-Keepers' Supplies.

NORTH-WESTERN CHAFF HIVES, 4-PIECE SECTIONS DOVETAILED, FRAMES, HONEY-BOXES, ETC.

Address **R. SCHMIDT,**
2 6db **Caroline, Shawano Co., Wis.**

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AT THE LOWEST PRICES.

ITALIAN QUEENS AND BEES.

J. C. SAYLES,
2 tfd **Hartford, Washington Co., Wis.**

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AT GREAT REDUCTION.

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LYNDON, WHITESIDE CO., ILLINOIS.
2t E

Wanted. Situation as apiarist, for wages, or bees on shares, in one of the following States: Louisiana, Arkansas, Tennessee, Kentucky, or California. Fourteen years' experience; can do all manner of hive work or foundation, etc. Address
3-5db S. SMITH, New Smyrna, Volusia Co., Fla.

Mirror, or Parti-scale Carp For Sale.

Spawners,	10 to 12	inches	in	length,	per doz.,	$6.00
"	8 to 10	"	"	"	"	5.00
Small fish,	2 to 4	"	"	"	100,	5.00

W. H. CARPENTER,
3-6db Springboro, Warren Co., Ohio.

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FOR SALE. Five pair fine Pekin ducks, at $4.00 per pair.
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Eggs, $1.25 PER 13, from pure-bred, single-comb Brown Leghorns. Unexcelled layers. Address H. B. GEER, Nashville, Tenn., or E. W. GEER, St. Mary's, Mo. 3-8db

Wanted. A partner, to go in the bee and supply business with me, for the business is increasing so fast that I can not manage it myself. Address or call upon LOUIS WERNER,
3-4d Edwardsville, Madison Co., Ill.

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Apply to CHAS. F. MUTH & SON,
CINCINNATI, O.
P. S.—Send 10-cent stamp for "Practical Hints to Bee-Keepers." 1tfdb

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To introduce my strain of pure bright Italians, equal to any in the United States, I will offer tested queens, $1.00 each: extra fine, selected, $1.50 each; one-frame nucleus, consisting of one extra select queen, one frame of brood, ½ lb. bees, for $2.00. If you want any bees, send me your address on postal and I will send you sample by return mail. Beeswax or honey taken in exchange.
22tfdb **THOMAS HORN,**
Box 691, Sherburne, Chen. Co., N. Y.

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WEEKLY, $1.00 PER YEAR.

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The only bee journal printed in Canada, and containing much valuable and interesting matter each week from the pens of leading Canadian and United States bee-keepers. Sample copy sent free on receipt of address. Printed on nice toned paper, and in a nice shape for binding, making in one year a volume of 832 pages. 9tfb

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Western headquarters for bee-men's supplies. Four-piece sections, and hives of every kind, a specialty. Flory's corner-clamps, etc. Orders for sections and clamps filled in a few hours' notice. Send for sample and prices.

M. R. MADARY,
22 21db **Box 172. Fresno City, Cal.**

DADANT'S FOUNDATION FACTORY, WHOLESALE AND RETAIL. See advertisement in another column.

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1tfdb **Corinth, Alcorn Co., Miss.**

3-4-6-7d

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Sections, Extractors, Smokers, Separators, &c., of Root's Manufacture, Shipped from here at ROOT'S PRICES.

Also S. hives of Southern yellow pine, and Bee-Keepers' Supplies in general. *Price List Free.*

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3tfdb

BEE-KEEPERS' GUIDE, Memoranda, and Illustrated catalogue, 48 pages; **FREE** to all bee-keepers sending address to
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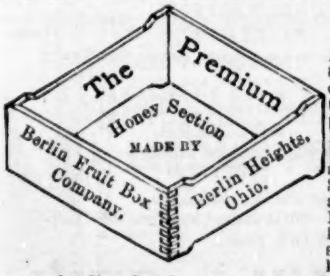
Order early, to give us the pleasure of filling orders promptly, by return mail—a pleasure to the sender and to the buyer. All from imported stock. We have no others. Prices: Untested, $1.00; tested, $2.00; dozen, $10.00. To dealers, special rates.
3-4d **Loreauville, Iberia Parish, La.**

FOR SALE.

One second-hand fdn. mill that will roll sheets 14 inches wide. The mill is at present in New Hamburg, Ont., Can. The original price on it was $40.00, but we will now sell it at half price, or $20.00.

Also one exactly like it, owned by W. W. Bliss, of Duarte, Los Angeles Co., Cal. There is nothing wrong with these mills, except that the rolls are of smaller diameter than those we now make, in consequence of which they do not make quite so thin fdn. right in the middle of the rolls as those made now with rolls of a larger diameter. They will, however, roll narrow sheets equal to any, and will roll sheets a foot wide; but when of so great a width, the center is a trifle thicker, as explained above.

A. I. ROOT, Medina, O.



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Our improved facilities for manufacturing these sections enable us to offer them at greatly reduced rates. Send for price list. Address as above. We also make the best berry-baskets in the market.
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—AND—

1886 CIRCULAR.

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CAPACITY, 1 CARLOAD OF GOODS PER DAY.

Best of goods at lowest prices. Write for Price List. 1tfdb. G. B. LEWIS & CO.,
Watertown, Wis.

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is asserted by hundreds of practical and disinterested bee-keepers to be the cleanest, brightest, quickest accepted by bees, least apt to sag, most regular in color, evenest, and neatest, of any that is made.

It is kept for sale by Messrs. A. H. Newman, Chicago, Ill.; C. F. Muth, Cincinnati, O.; Jas. Heddon, Dowagiac, Mich.; F. L. Dougherty, Indianapolis, Ind.; Chas. H. Green, Berlin, Wis.; Chas. Hertel, Jr., Freeburg, Ill.; Ezra Baer, Dixon, Lee Co., Ill.; E. S. Armstrong, Jerseyville, Illinois; Arthur Todd, Germantown, Philadelphia, Pa.; E. Kretchmer, Coburg, Iowa; Elbert F. Smith, Smyrna, N. Y.; C. T. Dale, Mortonsville, Ky.; Clark Johnson & Son, Covington, Kentucky; J. B. Mason & Sons, Mechanic Falls, Maine; C. A. Graves, Birmingham, O.; M. J. Dickason, Hiawatha, Kan.; J. W. Porter, Charlottesville, Albemarle Co., Va.; E. R. Newcomb, Pleasant Valley, Dutchess Co., N. Y.; J. A. Humason, Vienna, O.; G. L. Tinker, New Philadelphia, O., and numerous other dealers.

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SECTIONS, SMOKERS, COMB FDN., ETC.

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Bee-Hives, Sections, Foundation,
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Having a large stock of sections on hand, we will fill orders on Feb. at the following prices:

4¼ x 4¼, in lots of	500	to	4000, per	1000	$5 00
" " " "	5,000		"	"	4 75
" " " "	8,000		"	"	4 50
" " " "	12,000		"	"	4 00

The 4½x4½ at same prices, all V-grooved.

Our section-cases and shipping-crates are as good as any in the market, at corresponding low prices. For description and prices of the **Success Hive**, send for price list. Estimates given on all other makes. Queens and bees for 1886. We make a specialty of rearing the Albino queens and bees. Price list free. S. VALENTINE & SON,
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FRIENDS, if you want any Foundation it will pay you to purchase of us, as we have the very latest improved mills; heavy, 45 cts. per pound; very thin, for comb honey, 10 cts. more per pound; 10% discount on all orders received before April 1st. Send for free samples. Address

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ITALIAN BEES AND QUEENS,
Full Colonies, NUCLEI AND QUEENS, CHEAP.
Send for Circular.
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BEES IN IOWA. — SEE FOSTER'S — **ADVERTISEMENT.**

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SMOOTH ON BOTH SIDES. AT $3.50 PER 1000.
FOR LARGER LOTS, WRITE FOR PRICES.
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4-5 6d Goshen, Elkhart Co., Ind.

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TREES and PLANTS.

I will send by mail, postpaid, any one of the following;

100 *Catalpa-speciosa* Trees. As posts, they have stood 50 years, perfectly sound; good bee-tree.
100 Box-elder, nice shade-tree, and bees work on them early in the spring.
200 Golden-willow cuttings; make a beautiful tree; used for tying, etc.
25 Gregg Black-cap Raspberry, best variety.
50 Turner, perfectly hardy, always bears, and equal to white clover for honey.
25 Snyder Blackberry, the king of berries. Never winter-kills, never fails to bear.

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Untested queens, - - - -	$1.50	$1.25	$1.00
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Two-frame nuclei, no queen,	4.00	3.00	2.50

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To nail, or dovetailed, per 1000, $4.50. Send 2-cent stamp for sample and price list. 4tfd
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FOR SALE. BIRD and WATER DOG.
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NOTICE.—For $3.00 I will mail direct the great scientific work by Frank Cheshire, entitled, "Bees, and Bee-Keeping," now publishing in parts.
ARTHUR TODD, Germantown, Philadelphia, Pa.
Dadant Fdn. depot, Bees, Hives, and Supplies. 45d

50 COLONIES BEES FOR SALE.

I have 50 stands of bees for sale, hybrids and blacks, and in the Mitchell hive, 15 frames in hive, well painted, and metal rabbets. I live on the Arkansas Midland R. R., and can ship by R. R. or water via Helena. I will take $4.50 per stand, delivered on board train, and delivered by latter part of March. PETER METZ,
3-8db Poplar Grove, Phillips Co., Ark.

TESTED QUEENS, $2.00; untested, $1.00. Wax-extractor, $3.00. Other supplies. Send for circular.
OSCAR F. BLEDSOE, Grenada, Miss. 4tfd

Wanted. A bee-keeper; moral, able-bodied young man. Write at once, stating wages wanted, experience, references, etc.
4d J. M. KILLOUGH, San Marcos, Hays Co., Tex.

LEGS AND ARMS
(ARTIFICIAL)
WITH RUBBER HANDS AND FEET.
The Most Natural, Comfortable and Durable.
THOUSANDS IN USE.
New Patents and Important Improvements.
Special attention given to
SOLDIERS,
Ill. Pamphlet of 160 Pages
SENT FREE.
A. A. MARKS,
701 Broadway, New York.
18-5db

Please mention this paper.

WE WILL SELL

Chaff hives complete, with lower frames, for $2.50; in flat, $1.50. A liberal discount by the quantity. Simplicity hives, Section Boxes, Comb Fdn., and other Supplies, at a great reduction. We have new machinery, and an enlarged shop. **Italian Bees and Queens.** Send for Price List. 23 22db
A. F. STAUFFER & CO., Sterling, Ills.

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Names of parties wanting first-class dovetailed honey-sections, to whom samples will be sent on receipt of address. Also crates in season. A perfect iron section-box former sent for $1.00, and satisfaction guaranteed. **Geo. R. Lyon,**
4-9db GREENE, CHENANGO CO., N. Y.

WILL SELL 20 COLONIES OF BEES

In Simplicity hives, in fine condition, for $5.00 each, if paid for now. Will ship bees in spring.
Purchasers for the above can, if they prefer, send their cash to A. I. Root, Medina, O. 3-4-5d
I. L. PARKER, TRACY CITY, GRUNDY CO., TENN.

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HEADQUARTERS IN THE SOUTH

FOR THE MANUFACTURE AND SALE OF

BEE - KEEPERS' ⁘ SUPPLIES.

The only Steam Factory Erected in the South, Exclusively for the Manufacture of Hives, Frames, Sections, etc. The Viallon and Root Simplicity Hives a Specialty.

ITALIAN QUEENS,

Untested, in April, $1.25 each; $13.00 per doz. From May 5 to June 1, $1.10 each, $12.00 per doz. After June 1, $1.00 each, $10.00 per doz. Tested, $2.50 each; select tested, $3.00 each to first of June. Contracts taken with dealers for the delivery of a certain number of queens per week, at special figures.

FOUR-FRAME NUCLEUS,

With pure Italian queen, containing 3 pounds of bees when received; in April, $4.00; after May 25, 25 cts. less. Safe arrival and satisfaction guaranteed.

BEES BY THE POUND,

Delivered, express prepaid, in lots of 5 pounds or more. Send for price. Same discount given as offered by A. I. Root, in GLEANINGS from month to month. For more particulars, send for catalogue for 1886. **P. L. VIALLON,**

5-3d **Bayou Goula, Iberville Parish, La.**

BINGHAM SMOKERS

LAST AND PLEASE.

CLEREMONT, VA., Feb. 9, 1886.
Messrs. Bingham & Hetherington:—
Dear Sirs:—Please find inclosed $2.00, for which send, per return mail, a Bingham "Doctor" smoker. Respectfully yours, S. H. HUTCHINSON.

INDEPENDENCE, CAL., Jan. 2, 1886.
Messrs. Bingham & Hetherington:—Dear Sirs:—
The "Doctor" came to hand last night in good order. "It is a Daisy." Won't the little pets wink their eyes when they get some of his medicine? I have one of your "Large" smokers, which has been in use six years.
Respectfully yours, WM. MUTH-RASMUSSEN.

Bingham Smokers and Knives sent per mail, postpaid, at 65 cts. to $2.00. Send for free circular to

5tfd **BINGHAM & HETHERINGTON, ABRONIA, MICH.**

HONEY AND BEESWAX.

Our market, and location as a trade center, the rapid growth of our city and country, gives us a large demand for honey. We have found it impossible to keep a stock of 1-lb. frames, unglassed, and of which we are in need. This style of comb sells much faster than any other and we will make liberal offers on receipt of samples. We are well stocked on 2-lb. sections, also extracted. Beeswax wanted on commission. **CLEMONS, CLOON & CO.,**
KANSAS CITY, MO.

Names of responsible parties will be inserted in any of the following departments, at a uniform price of 20 cents each insertion, or $2.00 per annum, when given once a month, or $4.00 per year if given in *every* issue.

$1.00 Queens.

Names inserted in this department the first time without charge. After, 20c each insertion, or $2.00 per year.

Those whose names appear below agree to furnish Italian queens for $1.00 each, under the following conditions: No guarantee is to be assumed of purity, or anything of the kind, only that the queen be reared from a choice, pure mother, and had commenced to lay when they were shipped. They also agree to return the money at any time when customers become impatient of such delay as may be unavoidable.

Bear in mind, that he who sends the best queens, put up most neatly and most securely, will probably receive the most orders. Special rates for warranted and tested queens, furnished on application to any of the parties. Names with *, use an imported queen-mother. If the queen arrives dead, notify us and we will send you another. Probably none will be sent for $1.00 before July 1st, or after Nov. If wanted sooner, or later, see rates in price list.

*A. I. Root, Medina, Ohio.
*H. H. Brown, Light Street, Columbia Co., Pa. 1tf
*Paul L. Viallon, Bayou Goula, La. 1tfd
*S. F. Newman, Norwalk, Huron Co., O. 1tfd
*Wm. Ballantine, Mansfield, Rich. Co., O. 1tfd
*D. G. Edmiston, Adrian, Len. Co., Mich. 23tfd
*S. G. Wood, Birmingham, Jeff. Co., Ala. 1tfd
*S. C. Perry, Portland, Ionia Co., Mich. 23tfd
*E. Kretchmer, Coburg, Mont. Co., Iowa. 23tfd
D. McKenzie, Camp Parapet, Jeff. Parish, La. 1tfd
Ira D. Alderman, Taylor's Bridge, Samp. Co., N.C. 1tfd
G. F. Smith, Bald Mount, Lack'a Co., Pa, 23tfd
*Jos. Byrne, Baton Rouge, Lock Box 5, East Baton Rouge Par., La. 23tfd
J. W. Winder, Carrollton, Jeff. Par., New Orleans, La. 3tfd
*E. Burke, Vincennes, Knox Co., Ind. 3-1
Richard H. Bailey, Ausable Forks, Essex Co., N. Y. 5-15

Hive Manufacturers.

Who agree to make such hives, and at the prices named, as those described on our circular.

A. I. Root, Medina, Ohio.
P. L. Viallon, Bayou Goula, Iberville Par., La. 1tfd
C. W. Costellow, Waterboro, York Co., Me. 1-23
Kennedy & Leahy, Higginsville, Laf. Co., Mo. 23tfd
E. Kretchmer, Coburg, Montgomery Co., Ia. 23tfd
S. D. Buell, Union City, Branch Co., Mich. 5-7-9

DADANT'S FOUNDATION FACTORY, Wholesale and retail. See advertisement in another column. 3btfd

Here ⁘ We ⁘ Are ⁘ Again

⁘ FOR 1886. ⁘

Bound to sell cheaper than the cheapest. Bees, Comb Foundation, Hives, Sections, and Apiarian Supplies in general. Don't fail to send for our Circular, right off. **G. W. ALBRECHT,**

5-6-7d **DUNDAS, WISCONSIN.**

-BE SURE-

To send a postal card for my catalogue of **Albino and Italian Queen-Bees,** and see what my customers say about them, before purchasing elsewhere. Address D. A. PIKE,

5 7 9d SMITHSBURG, WASH. CO., MD.

CONTRACTS WANTED
—WITH—
SUPPLY DEALERS
FOR NEXT SEASON'S STOCK OF GOODS.

CHAFF, STORY AND HALF CHAFF, AND SIMPLICITY HIVES, SMOKERS, EXTRACTORS, COMB FOUNDATION, FRAMES, SECTIONS, BOOKS, ETC.,

At wholesale and retail. Unexcelled facilities. Circulars and estimates free. Successors to S. C. & J. P. Watts. Sta. Kerrmore, B. C. C., & S. W. R. R.

WATTS BROS., Murray, Clearfield Co., Pa.
1tfdb.

MUTH'S
HONEY-EXTRACTOR,
SQUARE GLASS HONEY-JARS,
TIN BUCKETS, BEE-HIVES,
HONEY-SECTIONS, &c., &c.
PERFECTION COLD-BLAST SMOKERS.

Apply to CHAS. F. MUTH & SON,
CINCINNATI, O.

P. S.—Send 10-cent stamp for "Practical Hints to Bee-Keepers." 1tfdb

LOOK HERE

To introduce my strain of pure bright Italians, equal to any in the United States, I will offer tested queens, $1.00 each; extra fine, selected, $1.50 each; one-frame nucleus, consisting of one extra select queen, one frame of brood, ½ lb. bees, for $2.00. If you want any bees, send me your address on postal and I will send you sample by return mail. Beeswax or honey taken in exchange.
22tfdb **THOMAS HORN,**
Box G91, Sherburne, Chen. Co., N. Y.

Wanted, Situation as apiarist, for wages, or bees on shares, in one of the following States: Louisiana, Arkansas, Tennessee, Kentucky, or California. Fourteen years' experience; can do all manner of hive work or foundation, etc. Address
3-5db S. SMITH, New Smyrna, Volusia Co., Fla.

Mirror, or Parti-scale Carp For Sale.

Spawners, 10 to 12 inches in length, per doz., $6.00
" 8 to 10 " " " " " 5.00
Small fish, 2 to 4 " " " " 100, 5.00
W. H. CARPENTER,
3-6db Springboro, Warren Co., Ohio.

NICE FOUNDATION, 35 CTS. PER LB. W. T. LYONS, Decherd, Franklin Co., Tenn. 345d

Eggs, $1.25 PER 13, from pure-bred, single-comb Brown Leghorns. Unexcelled layers. Address H. B. GEER, Nashville, Tenn., or E. W. GEER, St. Mary's, Mo. 3 8db

LEGS AND ARMS
(ARTIFICIAL)
WITH RUBBER HANDS AND FEET.
The Most Natural, Comfortable and Durable.
THOUSANDS IN USE.
New Patents and Important Improvements.
Special attention given to
SOLDIERS,
Ill. Pamphlet of 160 Pages SENT FREE.
A. A. MARKS,
701 Broadway, New York.
18-5b

Please mention this paper.

DADANT'S FOUNDATION FACTORY, WHOLESALE AND RETAIL. See advertisement in another column.

Bee-Keepers' Supplies.

NORTH-WESTERN CHAFF HIVES, 4-PIECE SECTIONS DOVETAILED, FRAMES, HONEY-BOXES, ETC.

Address **R. SCHMIDT,**
2 6db **Caroline, Shawano Co., Wis.**

FOR SALE. Five pair fine Pekin ducks, at $4.00 per pair.
1tfdb D. D. FARNSWORTH, Clive, Polk Co., Iowa.

NOTICE.—For $3.00 I will mail direct the great scientific work by Frank Cheshire, entitled, "Bees and Bee-Keeping," now publishing in parts.
ARTHUR TODD, Germantown, Philadelphia, Pa.
Dadant Fdn. depot, Bees, Hives, and Supplies. 45d

50 COLONIES BEES FOR SALE.

I have 50 stands of bees for sale, hybrids and blacks, and in the Mitchell hive, 15 frames in hive, well painted, and metal rabbets. I live on the Arkansas Midland R. R., and can ship by R. R. or water via Helena. I will take $4.50 per stand, delivered on board train, and delivered by latter part of March. PETER METZ,
3 8db Poplar Grove, Phillips Co., Ark.

WE WILL SELL

Chaff hives complete, with lower frames, for $2.50; in flat, $1.50. A liberal discount by the quantity. Simplicity hives, Section Boxes, Comb Fdn., and other Supplies, at a great reduction. We have new machinery, and an enlarged shop. **Italian Bees and Queens.** Send for Price List. 23 22db
A. F. STAUFFER & CO., Sterling, Ills.

WANTED.

Names of parties wanting first-class dovetailed honey sections, to whom samples will be sent on receipt of address. Also crates in season. A perfect iron section-box former sent for $1.00, and satisfaction guaranteed. **Geo. R. Lyon,**
4-9db GREENE, CHENANGO CO., N. Y.

WILL SELL 20 COLONIES OF BEES

In Simplicity hives, in fine condition, for $5.00 each, if paid for now. Will ship bees in spring. Purchasers for the above can, if they prefer, send their cash to A. I. Root, Medina, O. 34-5d
I. L. PARKER, TRACY CITY, GRUNDY CO., TENN.

IMPORTED QUEENS.

In April, - - - - - - 11 francs in gold.
May and June, - - - - - 10 " " "
July and August, - - - - 9 " " "
September and October, - - 7 " " "

No order received for less than 8 queens. Queens which die in transit will be replaced only if sent back in a letter. CHARLES BIANCONCINI & CO.,
1-11d Bologna, Italy.

THE PRACTICAL BEE-HIVE, one of the best, L. frame, a complete hive, sent on recipt of $2.50. Bees, queens, and supplies; also Plymouth Rock and Brown Leghorn eggs, $1.50 per sitting. Address
T. G. ASHMEAD, Williamson, Wayne Co., N. Y.
3-5-7d.

BEE-HIVES,
One-Piece Sections, Section Cases, Frames, &c.,
OF SUPERIOR WORKMANSHIP, FROM
SMITH & GOODELL,
Manufacturers of and Dealers in
APIARIAN SUPPLIES,
ROCK FALLS, WHITESIDE CO., ILL.
3tfd *Send for Price List.*

SOUTHERN HEADQUARTERS

FOR EARLY QUEENS,

Nuclei, and full colonies. The manufacture of hives, sections, frames, feeders, foundation, etc., a specialty. Superior work and best material at "let-live" prices. Steam factory, fully equipped, with the latest and most approved machinery. Send for my illustrated catalogue. Address

5tfd **J. P. H. BROWN, Augusta, Ga.**

LOOK HERE.

New Factory, new Machinery. Having owned and handled bees for twenty-two years, I now offer

APIARIAN SUPPLIES

Of my own manufacture. Our specialty will be on one-piece V-groove buckeye sections. You can not guess how white and beautiful they are. We make hives to order, of all sizes and patterns, though the hive we use is the Scientific hive, made in sections six inches high, put together without nails. Also Frames and Sections. We claim that we can get more section-box honey from this hive than any hive we know of. For circular, address

5-6d **J. B. MURRAY, Ada, O.**

18-INCH CEM PLANER

FOR SALE, FOR $70.00.

Franks' make; used about a month, and warranted in good order. Address E. Y. PERKINS,

3tfd Jefferson, Greene Co., Iowa.

TAR-HEEL APIARIES.

American Albino Italians (fully acclimated), Syrians, and Carniolans; two latter bred of imported others from Mr. Benton. *Warranted Queens.*— Per half-dozen, in April, $8.00; May, $6.00; June, $5.25. Nuclei, 75 cts. per L. frame of bees and brood; price of queen to be added. Bees, $1.00 per pound. Ready to mail by March 15, 12 or 15 fine tested golden Italian queens. Safe delivery. $2.25 cash, or $12.00 for 6. Send for list, now ready.

4—**ABBOTT L. SWINSON,** 71-66.

5tfd **GOLDSBORO, N. C.**

Italian Bees, Nuclei, and Queens,

From Imported and selected mothers. Send for Sixth annual Circular. **SIMON P. RODDY,**

5-7d MECHANICSTOWN, FRED. CO., MD.

J. W. K. SHAW & CO.,

Specialists in Italian-Queen Rearing

We are prepared to fill orders for early Queens, tested or untested. A large number are ready for mailing. We hope to supply all demands made in the early spring, and all after, by return mail. Price $1.00; doz., $10.00. Tested, $2.00. Special rates to dealers. **Lorcauville, Iberia Parish, La.**

5-6d

Comb Fdn., Bee-Hives, and other APIARIAN SUPPLIES.

579d **JAS. A. NELSON, Wyandotte, Kans.**

HAVING moved my large queen-rearing apiary from Lewisville to Milton, I will still furnish pure Italian bees and queens in any quantity and shape. Those wanting to start apiaries should write for prices. I also will furnish eggs from California bronze turkeys, at $1.50 per sitting of 9.

3-19d GEO. W. BAKER, Milton, Ind.

ALLEY'S DRONE & QUEEN TRAP.

Send 65c. and get sample by return mail.

4-7db HENRY ALLEY, Wenham, Mass.

EASTERN BEE-HIVE FACTORY

Especially adapted for manufacturing a full line of

APIARIAN SUPPLIES.

Having fitted up with new machinery, designed and built expressly for this work, my facilities are unsurpassed for doing FINE AND ACCURATE WORKMANSHIP.

120

Full colonies of golden and orange colored, and American Albino Italian Bees for sale; were bred last season, ON PURPOSE to enable me MORE FULLY TO SUPPLY THE GREAT DEMAND.

—ALSO—

Nucleus colonies, bees by the pound, and choice queens. For full particulars and LOW PRICES, send for my ILLUSTRATED CATALOGUE and a sample of the celebrated poplar sections, free on application.

E. L. WESTCOTT,

5d **Fair Haven, Rutland Co., Vermont.**

EARLY BEES AND QUEENS FOR SALE.

I can ship Colonies, Bees by the pound, and queens, early in spring. Prices on application. Address

5-7d G. W. BECKHAM, Pleasant Hill, Lanc. Co., S. C.

QUEENS, *1886.* QUEENS.

Reared from Imported Mothers. Two, three, and four frame nuclei. Safe arrival and satisfaction guaranteed. Send for price list. Address

5791ldb FRANK A. EATON, BLUFFTON, OHIO.

DADANT'S FOUNDATION FACTORY, WHOLESALE AND RETAIL. See advertisement in another column. 3btfd

JOB LOT OF WIRE CLOTH

AT GREATLY REDUCED PRICES.

SECOND QUALITY WIRE CLOTH AT 1½ CTS. PER SQUARE FT.

Inches Wide.	No. of Rolls.	SOME OF THE USES TO WHICH THIS WIRE CLOTH CAN BE APPLIED. This wire cloth is second quality. It will answer nicely for covering doors and windows, to keep out flies; for covering bee-hives and cages for shipping bees; making sieves for sifting seeds, etc. Number of Square Feet contained in each Roll Respectively.
10	1	1 roll of 72 s. f.
20	3	3 rolls of 166 s. f. each
22	1	1 roll of 160 s. f.
24	3	3 rolls of 200 s. f.
26	71	22 rolls of 217, 38 of 216, 2 of 195, 1 of 156, 2 of 215, 1 of 210 s. f.
28	13	10 rolls of 233, and 2 of 234, s. f.
34	7	5 rolls of 281 s. f.
38	37	28 rolls of 316, 2 of 285, 2 of 317, 1 each of 190, 632, 126, and 215 s. f.
42	1	1 roll of 245 s. f.
44	2	1 roll of 366, 1 of 348 s. f.
46	1	1 roll of 152 s. f.
48	4	4 rolls of 400 s. f.

FIRST QUALITY WIRE CLOTH AT 1¾ CTS. PER SQUARE FT.

The following is first quality, and is worth 1¾ cts. per square foot. It can be used for any purpose for which wire cloth is ordinarily used; and even at 1¾ cts. per sq. ft. it is far below the prices usually charged at hardware and furnishing stores, as you will ascertain by making inquiry. We were able to secure this very low price by buying a quantity of over one thousand dollars' worth.

Inches Wide.	
22	1 roll each of 88, 143, 92 s. f.
24	43 rolls of 200 sq. ft. each; 1 each of 120, 168, 190, 40, 150, 140 140 sq. ft.
26	57 rolls of 216 sq. ft. each; 1 each of 199, 195, 201, 200, 227, 54, 204 sq. ft.
28	73 rolls of 233, 11 of 221, 3 of 219, 8 of 222, sq. ft.; 1 each of 70, 245, 257, 93 sq. ft.
30	36 rolls of 250 sq. ft.; 1 each of 137, 225, 125, 125, 220, 227, 237, 235, 275, 240 sq. ft.
32	13 of 266, 7 of 256, 2 of 253 sq. ft.; 1 each of 250, 275 sq. ft.
34	30 rolls of 283 sq. ft. each.
36	22 rolls of 300 sq. ft. each; 1 each of 288, 150, 279, 285, and 72 sq. ft.
38	1 roll each of 300 and 316 sq. ft.
40	1 roll of 233 square feet.
42	1 roll of 350 square feet.
46	1 roll of 192 square feet.

A. I. ROOT, Medina, Ohio.

HONEY COLUMN.

CITY MARKETS.

CLEVELAND.—*Honey.*—The honey market is very good just now for best 1-lb. white, at 14, with an occasional sale of a single crate at 15. Second grade, 13; 2-lb. sections, best white, 13c. Old, 10@11. Extracted, 7@8. *Beeswax*, 25. A. C. KENDEL,
Feb. 20, 1886. 115 Ontario St., Cleveland, Ohio.

CHICAGO.—*Honey.*—Choice comb honey is in good demand at 16c per pound. The best lots arriving here are from New York State and N. Ohio. Extracted sells from 6@8c, and in fair demand.
Beeswax, 25@26c. All grades are wanted in this market at present. R. A. BURNETT,
Feb. 25, 1886. 161 S. Water St., Chicago, Ill.

DETROIT.—*Honey.*—No change in the honey market; very slow sales, at prices last quoted; viz., 14c for best white in pound sections, in clean cases. *Beeswax*, 23@25c. M. H. HUNT,
Feb. 22, 1886. Bell Branch, Mich.

BOSTON. — *Honey.* — 1-lb. sections, 13 @ 14; 2-lbs., 11@12; Slow sale. Extracted honey, 6@8. *Beeswax*, 28. BLAKE & RIPLEY,
Feb. 22, 1886. 57 Chatham St., Boston, Mass.

ST. LOUIS. — *Honey.* — We quote comb honey in better demand. Good bright stock, 12½c. Extracted, 8c in large cans; 9c in small cans. Case honey has good demand. *Beeswax* wanted at 23c.
Feb. 23, 1886. W. T. ANDERSON & CO.,
104 N. 3d Street, St. Louis, Mo.

MILWAUKEE. — *Honey.* — The demand for choice comb honey in sections has been much improved of late, and selling at 15@16c readily, and we think, if extra fine quality, could get 17c. We will quote 1-lb. sections, choice, 15@17. Dark honey very slow, 12@13. Extracted, scarce, and wanted, 7@8c; old comb, 12½@13. A. V. BISHOP,
Feb. 20, 1886. 142 W. Water St., Milwaukee, Wis.

NEW YORK.—*Honey.*—There is no remarkable change in the honey market. The demand keeps up as we expected, and before long all first class honey will be cleaned out.
Feb. 23, 1886. THURBER, WHYLAND & CO.,
Reade & Hudson Sts., New York.

KANSAS CITY.—*Honey.*—Sales are improving, and we have a good trade in comb, although prices are not as firm, owing to good prospects in California for a big crop, having reduced their prices about 2 cts. Choice comb, 1-lb. sections, 16; fair and dark, 12@14; 2-lb. sections, 12@14; extracted, dull and slow. Dark, 3½ to 4; white, 6@7. *Beeswax*, 23.
Feb. 22, 1886. CLEMONS, CLOON & CO.,
Cor. Fourth & Walnut St's, Kansas City, Mo.

CINCINNATI. — *Honey.* — There is no speculation whatever in the market, and demand is slow for extracted honey from manufacturers, while it is fair for honey in glass jars for table use. Demand for comb honey is slow, and the market is well supplied with all kinds. Extracted honey brings 4@8c on arrival, and choice comb honey brings 12@15c per lb. in a jobbing way. *Beeswax.* — There is a good home demand for beeswax, while arrivals are slow. We pay 25@27c per lb. for good yellow to choice, on arrival. CHAS. F. MUTH & SON,
S. E. Cor. Freeman and Central Avenues,
Feb. 24, 1886. Cincinnati, Ohio.

FOR SALE—1500 lbs. of white-clover and linn extracted honey, put up in new oak kegs, of 175 lbs. each, delivered on board cars here for 8c per lb.
F. W. HOLMES, Coopersville, Mich.

BEES & PLANTS.

20 stands of Italians at $5.00; and 20 stands of hybrids at $4.00 per stand, all in Simplicity hives of Root's pattern. Also pure Gregg, Cuthbert, and Turner raspberry-plants for sale at $1.00 per 100, or $8.00 per 1000. Address
567d **A. F. ROBINSON, Marysville, O.**

Y&.. BB WYANDOTTE FOWLS, ITALIAN BEES, QUEENS, and SUPPLIES. Send for Price List.
W. H. OSBORNE, CHARDON, OHIO.
5-7-9db

RUBBER PRINTING-STAMPS

For bee-men; stamps of all kinds; send for catalogue and sample cuts printed on sections.
5 G. W. BERCAW, Berwick, Ohio.

SIMPLICITY BEE-HIVES. 42¼ cts.; two-story Langstroth, 90 cts. Leconte pear-trees, 20 cts. each. Pecan duck eggs, 13 for $1.00.
5d THOS. A. GUNN, TULLAHOMA, TENN.

NOTICE THE LOW PRICES ON

Bees, Brood, Queens, Plants, Etc.,

IN MY NEW CIRCULAR. PLEASE WRITE FOR ONE.
C. WECKESSER,
5-7-9db **Marshallville, Wayne Co., Ohio.**

SECTIONS

Dovetailed, or to nail; planed, or smooth sawed. Any size made to order. Sure to please you, and sold at the lowest price for good sections. Send stamps for samples and prices, stating size and quantity wanted. Any size of frame made to order, and shipping-crates in season. 5-6-7d
F. GRANGER & SON, HARFORD MILLS, CORTLAND CO., N. Y.

100 Colonies of Bees for Sale!

My 650 colonies of bees are more than I can well handle, and I will sell 100 full colonies at $5.00 each for hybrids, $6.00 for pure Italians. Discount on larger numbers. I will also sell a few colonies of Caucasian bees, which breed I imported from the Caucasus Mountains, Asia, in 1880, and have found them of great value to me. Address
JULIUS HOFFMANN,
5-6 7d **Canajoharie, Mont. Co., N. Y.**
(Formerly Ft. Plain, N. Y.)

STANLEY'S AUTOMATIC

HONEY-EXTRACTOR

Is the most practical, complete, and perfect, and the only self-reversing honey-extractor made. They are a perfect protection to the combs, and are handy, durable, and cheap. I can now furnish them, either wholesale or retail, on short notice. Those wishing to handle them largely should get my price for the inside work and put up the machines to suit their customers. I will take a limited number of colonies of bees in exchange for extractors. The Automatic has never failed to take first prize wherever shown. Address 5d
G. W. STANLEY, Wyoming, N. Y.

SIMPLICITY & LANGSTROTH HIVES

All dovetailed Sections, Frames, Crates, Wire Nails, etc. Send for circular. **GEO. WHEELER,**
5tfdb **Norwich, Chenango Co., N. Y.**

Brown Leghorn Chickens,
PEA FOWLS,
AND WHITE GUINEA FOWLS
EGGS IN SEASON.

Send for descriptive catalogue and price list. 5d
EDWARD S. LEA,
Brighton, Montgomery Co., Md.